

# **VALENTINE NATIONAL WILDLIFE REFUGE**

**Valentine, Nebraska**

**Annual Narrative Report**

**Calendar Year 2012**

## **INTRODUCTION**

Valentine National Wildlife Refuge (NWR) was established on August 4, 1935 under the Migratory Bird Conservation Act by Executive Order 7142. The purpose of the refuge as stated in the executive order is “as a refuge and breeding ground for migratory birds and other wildlife.” Acquisition funding came from Duck Stamp sales and the Emergency Conservation Fund Of 1933.

The 71,772-acre Valentine NWR is located in the Sandhills of north-central Nebraska. The Sandhills contain the largest remaining stands of mid and tall grass native prairie left in North America. The refuge is a unique and ecologically important component of the National Wildlife Refuge System. The refuge has about 49,000 acres of grassy, undulating sand dunes, 13,000 acres of sub-irrigated meadows, and 10,000 acres of shallow lakes and marshes. The refuge is home to 271 species of birds, 59 species of mammals, and 22 species of reptiles and amphibians. The refuge is important to nesting and migrating waterfowl and is also one of the few places where good numbers of sharp-tailed grouse and prairie chickens can be found in the same area. Several threatened or endangered birds stop at the refuge during migration. Two listed plants and one listed insect are also found here. Most of the native flora and fauna found here historically are still present today.

The refuge is part of a complex administered from Fort Niobrara NWR. Valentine NWR is in Cherry County with a sub-headquarters located on Pony Lake, about 29 miles south of the town of Valentine on US 83. Valentine National Wildlife Refuge staff also manages the Yellowthroat Wildlife Management Area in Brown County (see J.3) and four easements (see F.13).

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INTRODUCTION.....	2
TABLE OF CONTENETS.....	3
A. <u>HIGHLIGHTS</u> .....	6
B. <u>CLIMATIC CONDITIONS</u> .....	6
C. <u>LAND ACQUISITION</u> .....	ntr
1. Fee title.....	ntr
2. Easements.....	ntr
3. Other.....	ntr
D. <u>PLANNING</u> .....	7
1. Master Plan.....	ntr
2. Management Plan.....	ntr
3. Public participation.....	ntr
4. Compliance with Environmental and Cultural Resource Mandates.....	8
5. Research and Investigations.....	8
6. Other.....	ntr
E. <u>ADMINISTRATION</u> .....	9
1. Personnel.....	9
2. Youth Programs.....	ntr
3. Other Manpower Programs.....	ntr
4. Volunteer Program.....	ntr
5. Funding.....	11
6. Safety.....	12
7. Technical Assistance.....	ntr
8. Other.....	12
F. <u>HABIATAT MANAGEMENT</u> .....	14
1. General.....	14
2. Wetlands.....	14
3. Forests.....	18
4. Croplands.....	ntr
5. Grasslands.....	19
6. Other Habitats.....	ntr
7. Grazing.....	20
8. Haying.....	31
9. Fire Management.....	38
10. Pest Control.....	40
11. Water Rights.....	ntr

[Type text]

12. Wilderness and Special Areas.....	51
13. WPA and Other Easement Monitoring.....	53
G. <u>WILDLIFE</u> .....	54
1. Wildlife Diversity.....	54
2. Endangered and/or Threatened Species (including plants).....	55
3. Waterfowl.....	66
4. Marsh and Water Birds.....	68
5. Shorebirds, Gulls, Terns, and Allies.....	69
6. Raptors.....	70
7. Other Migratory Birds.....	70
8. Game Mammals.....	71
9. Marine Mammals.....	ntr
10. Other Resident Wildlife.....	73
11. Fisheries Resources.....	84
12. Wildlife Propagation and Stocking.....	ntr
13. Surplus Animal Disposal.....	ntr
14. Scientific Collections.....	ntr
15. Animal Control.....	ntr
16. Marking and Banding.....	ntr
17. Disease Prevention and Control.....	88
H. <u>PUBLIC USE</u> .....	89
1. General.....	89
2. Outdoor Classrooms – Students.....	91
3. Outdoor Classrooms – Teachers.....	ntr
4. Interpretive Foot Trails.....	91
5. Interpretive Auto Tour Routes.....	91
6. Interpretive Exhibits/Demonstrations.....	ntr
7. Other Interpretive Programs.....	ntr
8. Hunting.....	92
9. Fishing.....	93
10. Trapping.....	95
11. Wildlife Observation.....	95
12. Other Wildlife Oriented Recreation.....	ntr
13. Camping.....	ntr
14. Picnicking.....	ntr
15. Off-Road Vehicling.....	ntr
16. Other Non-Wildlife Oriented Recreation.....	ntr
17. Law Enforcement.....	96
18. Cooperation Associations.....	97
19. Concessions.....	ntr

[Type text]

I. <u>EQUIPMENT AND FACILITIES</u> .....	97
1. New Construction.....	97
2. Rehabilitation.....	98
3. Major Maintenance.....	98
4. Equipment Utilization and Replacement.....	99
5. Communication Systems.....	ntr
6. Computer Systems.....	100
7. Energy Conservation.....	100
8. Other.....	ntr
J. <u>OTHER ITEMS</u> .....	100
1. Cooperative Programs.....	ntr
2. Other Economic Uses.....	ntr
3. Items of Interest.....	100
4. Credits.....	101
K. <u>FEEDBACK</u>	

## **A. HIGHLIGHTS**

Drought hit the Sandhills and the refuge hard. (B)

Maintenance Worker Dave Kime retired after 40 years of government service. (E1)

Refuge Manager Mark Lindvall received the 2012 Career Professional Award from the Nebraska Chapter of the Wildlife Society. (E8)

Bald eagles nested and fledged 2 young on the refuge. This is the first successful nest recorded on the refuge. (G-6)

An Aquatic Habitat Project for the refuge fishing lakes was initiated. (G11)

Fishing access was greatly improved with new ramps, docks, and parking. (I1)

A new centrally located office was constructed at Pony Lake. (I1)

## **B. CLIMATIC CONDITIONS**

No temperature records (high or low) were set in 2012 (Table B1). Overall temperatures for the year were above average, and precipitation was below average. The year will be remembered for being a hot, dry one, especially after the April, when everything really began to dry out. Average low temperatures for the year were nearly 3°F above the 2003-2012 average, and the average high temperatures were 5.5°F above average. The average daily minimum temperature was above the 95% confidence interval from Jan-Apr, and in Jun-Jul. The average daily maximum temperature was above the 95% confidence interval in Jan and Mar-Sept. March in particular was unusually warm, with the average minimum and maximum temperature at 9.8°F and 13.9°F above the respective averages. Average minimum and maximum temperatures for the remaining months fell within the 95% confidence interval of the mean. Total precipitation in 2012 was among the lowest totals on record, with only 1989 having a lower amount. The year began with precipitation totals near average, but beginning in May, precipitation amounts were well below average for the rest of the year. Low precipitation combined with warmer than normal temperatures to cause lake water levels to fall and many wetlands to dry up by the end of the summer. Snowfall for the year was about 1.5" less than average, and well within the 95% confidence interval around the mean. There was snow cover on the ground for about 30 days in 2012. The year began with poor ice conditions and open water across the

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refuge lakes. Cooler weather prevailed from mid-Jan to mid-Feb, allowing the lakes to freeze over again. Ice went off for the winter around Feb 18<sup>th</sup>. Lakes stayed largely open until Dec 9<sup>th</sup>, and remained frozen through the end of the year.

A more detailed description of month by month weather conditions can be found on the biologist's computer (C:\Documents and Settings\nennemanm\My Documents\mel\Work files\MAR, and C:\Documents and Settings\nennemanm\My Documents\mel\Work files\Weather).

Table B1. Monthly weather data summary from the weather station at Hackberry Headquarters, Valentine NWR, during 2012.

Month	Precip. (inches)	Snow (inches)	Temperature (° F)				Record Temperature (° F)			
			Min	Ave	Max	Ave	Min	Year	Max	Year
Jan	0.16	1.3	-6	20.5	67	46.5	-38	1894	70	1974
Feb	1.4	12.8	-8	20.0	54	42.6	-37	1899	76	1982
Mar	0.32	0	16	37.9	82	67.2	-28	1948	87	1946
Apr	3.61	0	28	40.5	90	66.8	-8	1936	97	1992
May	1.02	0	35	47.5	89	75.4	17	1909	102	1934
Jun	0.9	0	47	60.4	101	88.7	30	1973 <sup>a</sup>	107	1937
Jul	1.48	0	55	66.3	105	96.1	38	1971	111	1990
Aug	0.46	0	46	59.9	105	91.2	34	1935	108	1947 <sup>a</sup>
Sept	0.42	0	36	50.0	96	83.8	12	1926	103	1952
Oct	0.29	3.2	23	36.1	82	65.1	-6	1925	96	1922
Nov	0.5	6.7	5	28.5	75	53.8	-36	1887	82	2010 <sup>a</sup>
Dec	0.29	3.8	-1	20.0	66	41.6	-34	1907	76	1936
Total	10.85	27.8	Average precipitation (1945-2012)							21.52

<sup>a</sup> Indicates the most recent year record was observed.

## **C. LAND ACQUISITION**

1. **Fee Title**
2. **Other**

## **D. PLANNING**

1. **Master Plan**

#### **4. Compliance with Environmental and Cultural Resource Mandates**

We reviewed the letter from Grand Island Enhancement on the work to be done on US Highway 83 through Valentine NWR during the summer. The work will consist of resurfacing existing pavement. No staging or mill sites will be located on the refuge. The work was completed as planned.

Twenty seven boxes of historical publications, books, reprints, files, employee logs, and correspondence were sent to be archived at the National Conservation Training Center Library. There were some interesting items that hopefully will be a valuable addition to the Library. As I was packing it up it was interesting to see that we are still working on many of the same problems as 50 years ago.

#### **5. Research and Investigation**

##### **b. Ongoing research at Valentine NWR**

Special use permits were issued to the following research and monitoring projects conducted on the refuge this year.

Dr. Robert Gibson, University of Nebraska Lincoln, Stress as a cost of lek display in sharp-tailed grouse. A summary of Dr. Gibson's findings can be found in section G 10a. Other resident wildlife; Prairie grouse.

Mark Kaemick, South Dakota State University, Abiotic and Biotic Influences on fish communities in Nebraska Sandhills Lakes

Nick Smenk, EPA contract, Nebraska wetland condition assessment

Amanda Fujikawa, University of Nebraska Lincoln, Survey of blow fly and beetle populations in the Sandhills

Barbara Hayford, Wayne State College, Survey of large brachiopods and non-biting midges

Craig Davis, EPA contract, National Lakes Assessment 2012



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## **E. ADMINISTRATION**

### **1. Personnel**

Valentine National Wildlife Refuge is part of the Fort Niobrara/Valentine National Wildlife Refuge Complex with three permanent and one permanent part time staff assigned to the station.

#### **Permanent Staff**

Mark Lindvall	Refuge Manager	GS-12
Mel Nenneman	Wildlife Biologist	GS-11
Dave Kime	Maintenance Worker	WG-8 retired in August
Gordon Suhr	Maintenance Worker	WG-8 career seasonal March 12 – October when converted to full time permanent

#### **Temporary Staff**

Matt Coleman	STEP Biological Science Aid GS-0404-2	May 14 -Aug 24
Taylor McPeak	STEP Biological Science Aid GS-0404-2	May 14 -Aug 4
Alex Lingenfelter	STEP Biological Technician GS-404-3	May 14–Aug 4

Gordon Suhr converted from career seasonal to a full time permanent position vacated when Dave Kime retired. The career seasonal position will be advertised and filled next year.



Photo E-1. Maintenance Worker Dave Kime retired with 40 plus years of service. JG

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The following article about Dave Kime written by Kyle Graham appeared in the local newspaper. Dave and his family have a strong connection to the refuge and this area.

George Kinsley Sawyer was sent to the Sandhills of Nebraska to die. Dave Kime's grandfather had tuberculosis and moved from Elgin, Illinois to the present day Valentine National Wildlife Refuge (VNWR) in the 1880's. The drier climate seemed to boost George's health and he and his brothers acquired around 30,000 acres. Fast forward 132 years, Dave Kime recently retired from 40 years of federal service, the bulk of which occurred on land purchased from his own family. The federal government finalized the purchase of VNWR in 1935 resulting in the Sawyer family moving from lakes and wet meadows to the rough and choppy Snake River canyon, below present day Merritt Reservoir. At the time, the Snake River canyon was not desirable due to the roughness of the terrain and lack of hay meadows. Dave's childhood memories consist of spending his day's on horseback and rarely making a trip into Valentine. In the 1950's, Dave's mother Elizabeth (Betty) Sawyer fed Bureau of Reclamation surveyors as they made plans to build Merritt Reservoir. In 1962, an oil road was built out to Merritt Reservoir and as a result traffic increased, along with visitation to Snake Falls.

In high school Dave acquired a passion for flying, his father (Les Kime) had a Super Cub in which he learned to fly. In February of 1966, when the draft board warned him that his draft notice was imminent, Dave quickly enlisted in the Army with the promise of becoming a helicopter pilot. One year later, he arrived in Vietnam as a combat helicopter pilot, averaging nearly 100 hours a month. Dave says, "We went from happy go lucky to sheer terror in seconds, then back to happy go lucky." His assault helicopter company was in some of the heaviest fighting of the Vietnam War and only lost one pilot over the course of one year. Although Dave comments that he would have choose flying in the Vietnam War rather than flying in combat today. Helicopter pilots today contend with surface to air missiles and heat seekers compared to mostly small arms and 50 calibers in Vietnam. Arriving back in the states he functioned as a helicopter tactics flight instructor at Fort Rucker. The Army gave him three choices, two of which included going back to Vietnam, Dave chose to leave the military and return to Valentine. The flying jobs were few and far between because of the amount of veterans coming back from the Vietnam War. His spirit for flying was also dampened by the news of his brother dying in a plane wreck.

Dave and Annie were living in Valentine when a temporary job became available at VNWR. One temporary job led to the next and soon Dave became a full time refuge employee, housed at Pelican Lake in a large white house built by a ranch family prior to the refuge. Interestingly, the house was purchased out of a Sears and Roebuck catalog in 1925, shipped in cut pieces and assembled on the site. The 3 story, 5 bedroom house was built by the Newman family who previously lived in a "soddy." The Newman family had a large family but only lived in the house 10 years before the land was purchased for a Wildlife Refuge. Dave felt that he was extremely lucky to have such a large home for his young family. Dave and Annie lived on Pelican Lake for 38 years while Dave worked as a maintenance worker; repairing fences, windmills, and various shop work. He had a

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reputation as a skilled builder, inventor, and could generally fix anything without a trip to town.

Dave and Annie have purchased a home in Prescott, Arizona and plan to spend their retirement doing, “whatever I darn well want to do.” Dave looks forward to not having to be somewhere at a certain time but does not plan on sitting still. Between golfing, grandkids, traveling, and enjoying their new home in Arizona it appears there will be little time for sitting still.

#### Seasonal Biological Technician

Alyx Lingenfelter was hired as a biological technician on Valentine NWR for the 2012 field season. Alyx helped conduct most of the biological surveys and monitoring done on Valentine Refuge through the summer, including waterfowl pair and brood counts, blowout penstemon and western prairie fringed orchid surveys, auditory surveys for American bullfrogs, and invasive plant mapping. For her senior thesis at UN-K, she also sampled bullfrogs for the presence of the chytrid fungus and collected bullfrogs to analyze food habits. Through the summer, she also tracked locations of bullfrogs across the refuge, and established that bullfrogs occur in nearly all of the lakes and wetlands across the refuge.

## **2. Youth Programs**

## **4. Volunteers**

## **5. Funding**

Valentine NWR is part of a Complex and does not receive a separate funding allocation. The following special funds were received or applied for.

In FY 11 Visitor Facility Enhancement funds in the amount of \$144,030 were received for docks and boat ramps for the refuge fishing lakes. Additional funds left over from other VFE projects were added to bring the total available to \$240,000. Nebraska Game and Parks has agreed to help us with an additional \$100,000 to complete the work.

We applied for \$187,971 from the Regional Director’s Fund to remove trees invading prairies. If funded, we would have used the money to hire additional summer employees, for fuel, equipment rental, prescribed fire crews, and repairs. The proposal was not funded.

The Sandhills Weed Management Area received a grant for \$10,000 to continue work on the early detection and response to purple loostrike and invasive phragmites in the area around Valentine NWR.

Valentine NWR and the Nebraska COOP Unit applied for a Science Support Grant in the amount of \$60,000 to prepare an integrated pest management plan for common carp in the Marsh Lakes. No funding was received.

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Refuge Roads funds in the amount of \$39,520 were received and were used to purchase gravel for the entrance road for the new office, patch areas of the Little Hay Road where the base is showing, and firm up soft spots on the Pelican Lake/Calf Camp Road.

Nebraska Game and Parks funded a \$40,000 Lidar survey of the refuge fishing lakes area as part of the Aquatic Habitat Project.

A kick off meeting for the Aquatic Habitat Project was held on August 18 with staff from EA Engineering, Science, and Technology. EA received the contract to design and monitor construction for improved water and carp management on the refuge fishing lakes. They will receive approximately \$240,000 for their work. The meeting was a good one as we were able to better define our expectations, provide some historical information that is useful to the project, and outline some constraints that exist. EA also had a survey team up to survey the existing water control structures and dikes. Nebraska Game and Parks is paying for the work.

## **6. Safety**

Maintenance Worker Kime smashed a finger while lifting a flash board out of a water control structure. We are looking at replacing the heavy planks with lighter materials.

The station safety self inspection was completed.

Safety tips from the regional office are discussed along with any safety concerns at our weekly staff meeting.

## **7. Technical Assistance**

## **8. Other**

### **a. Meetings**

Nenneman organized the annual prairie grouse wing bee with NGPC and USFS. The wing bee was held on 7 Feb 2012 at the Valentine NWR bunkhouse. The prairie grouse hunting season was extended until the end January beginning with the 2010/2011 season.

Refuge Manager Lindvall attended the Project Leaders Meeting held at the Rainwater Basin WMD on April 25 and 26.

Lindvall and Nenneman attended the Nebraska Chapter of TWS annual meeting in Hastings on March 2 and 3. The emphasis was on woodland management. Lindvall is the current NETWS treasurer, and this year he received the Career Professional Award at the meeting.

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A meeting concerning wind power generation in the Sandhills was held with refuge staff and Craig Allen and Caroline Jezierski from the Nebraska COOP Unit on March 6. It appears that wind power generation is coming to the Sandhills. Caroline is working on recommendations to minimize impacts to wildlife and habitats from the proposed development.

Refuge staff met with staff from the Nebraska Game and Parks for a coordination meeting on June 11. We shared our concern about low mule deer numbers on Valentine NWR (no mule deer harvested on the refuge in 2011). We also talked about the Boating Access and Aquatic Habitat projects that we are doing in cooperation with Game and Parks.

The annual fisheries coordination meeting with the USFWS, NGPC, and SDSU was held at the Ft. Niobrara NWR conference room on 28 Feb 2012.

A meeting of biologists and managers from Sandhills refuges was held on 22-23 Feb 2012. This meeting brought together the zone biologist (Murray Laubhan), and biologists and managers from Crescent Lake, LaCreek, Ft. Niobrara, Valentine, and Quivera NWRs. The objective of the meeting was to identify common ground between the refuges, and explore ways that the refuges could work together for the benefit of all.

On June 12 refuge staff met with Congressional Aides for Congressman Adrian Smith and Senator Ben Nelson. We updated them on the boating access project, aquatic habitat project, road improvements, and the new office construction.

Refuge Sup Barbra Boyle was out for the Congressional and Game and Parks meetings and also was able to spend time on the refuge and meeting with refuge staff.

Zone Sup Barbara Boyle and SAMMS Stacy Hoehn visited Valentine NWR on September 28 and reviewed future MMS projects and facilities at the refuge.

#### b. Training

Lindvall, Suhr, and Nenneman completed the annual fire refresher on April 12. Nenneman completed the pack test on May 23<sup>rd</sup> to remain qualified as a red-carded firefighter.

Nenneman attended fire training on 19-20 May in Rapid City, SD. He completed S-230 and S-231 (single resource Crew boss and single resource Engine Boss) training. These courses were offered as a blended learning training, with 20+ hours of training on the internet, and two days of classroom work. Nenneman now has a taskbook open for both engine operator and engine boss.

On 31 May and 8 Aug, Nenneman provided ATV safety training for seasonal employees from the Ft. Niobrara/Valentine NWR Complex. The course emphasizes safe use of ATVs and UTVs for conducting a variety of refuge jobs. The course also covers proper

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tie down procedures for transporting ATVs and ORUVs. This year seasonal employees Taylor McPeak, Scott Rupe, Daniel Bloemer, and Adam Deras were provided instruction in ATV/ORUV use.

Nenneman completed the on-line training courses as mandated. Certificates for federal information systems security and discrimination and whistleblowing in the workplace were sent to Ft. Niobrara for filing.

Gordon Suhr completed air boat training in North Dakota. He now needs 40 hours of stick time to complete the required training.

Alyx Lingenfelter, Matt Coleman, and Tayler McPeak all completed Basic Fire Fighter Training and the passed the pack test. The computer modules took way too much time as they locked up or would not print certificates.

Refuge Manager Lindvall completed the annual 8 hours of EEO training.

## **F. HABITAT MANAGEMENT**

### **1. General**

The 71,772 acre Valentine NWR lies at the heart of the Nebraska Sandhills. These grass-stabilized sand dunes provide some of the best native mixed- and tallgrass prairie remaining in the U. S. The refuge contains rolling, vegetated sand dunes and interdunal valleys that characterize the Sandhills region. Shallow lakes and wetlands are interspersed throughout the valleys, grading into subirrigated meadows. Sandhills and choppy sandhills range cover about 59,000 acres. Native grasses provide the dominant vegetation cover, although some areas have been invaded by Kentucky bluegrass and smooth brome. Other exotic plants of concern include small areas of leafy spurge, Canada thistle, Garrison creeping foxtail and spotted knapweed. Low water in larger lakes and wetlands during the past few years has allowed Canada thistle and cottonwood trees to proliferate in the wetland margins. Grassland management is accomplished using permittee grazing and haying, prescribed fire, rest, and weed control.

### **2. Wetlands**

In the spring, water levels on the refuge were high. Boards were pulled from some water control structures in an effort to lower lake levels. We ran additional water but had limited success in lowering the lakes. Water was run to lower the lakes in an attempt to increase emergent vegetation, facilitate the upcoming boat ramp construction, and allow for water storage. If we can reduce the amount of water going off the refuge in July, it reduces complaints of flooding by downstream landowners mowing meadows. We then

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entered a severe drought which very effectively lowered all refuge lakes. Stop logs were placed in all the refuge water control structures in order to catch some water should it ever decide to rain. On all but Whitewater Lake the water would have to come up even to reach the structure.

Carp have cut a channel at the outlet of Dad's Lake. Presently the channel is not lowering the lake level but could if it continues to cut back towards the lake. The lake is in the proposed wilderness area. We are looking for a low tech, non-obtrusive way to prevent further erosion. The best option may be a Geoweb mat to prevent further erosion and a carp barrier on the culvert west of Homestead Lake.

There are 37 major wetland/lake areas on Valentine NWR that comprise about 13,000 acres. Lakes and wetlands on Valentine NWR started the year with near average water levels, but dried out significantly through the summer with the combination of high temperatures, windy days, and lack of rainfall. Based on measures of lake levels (Table F.2.1) and USGS groundwater wells (Table F.2.2), the groundwater on Valentine Refuge saw a significant drop during the summer drought.

Seven lakes on Valentine NWR have had elevations recorded more or less continuously since 1988. While 20+ years of data is hardly a long term data set, it does provide a basis for comparison, and there has been a period of higher than average precipitation and lower than average precipitation during these years. An exception in this data is for Willow Lake, where the water control structure washed out in 1997. Elevations reported here for Willow Lake are those recorded after 1997. Spring lake levels were near average, with the difference from average for all lakes except Willow L. at 0.38 inches below average. Willow Lake was 2.44 feet above average, but has records only from 2006-present. Other lakes ranged from 9.45 inches below spring average at Dewey L. to 9.24 inches above average at Hackberry L. By late summer, water levels had fallen below average for all lakes except Willow L., which was 4.9 inches above its fall average. The remaining lakes were on average 19.56 inches below their respective fall averages. Perhaps a better way to consider how much the lake levels were impacted by the summer drought is to consider the change in elevation between April and Sept. If you subtract the fall average lake level from the spring average lake level for each lake, on average, the 7 refuge lakes drop by 9.98 inches during this time period. In 2012, these lakes dropped an average of 29.9 inches. Watts Lake experienced the greatest drop from spring to fall, losing 3.19 feet in elevation, while Pelican had the smallest drop at only 1.96 feet. The fall 2012 lake elevation represents the lowest level for Dewey, Watts, and Whitewater lakes. Falling lake levels meant that all or almost all of the tall, emergent wetland vegetation in the lakes was out of the water, and most lakes had a substantial amount of mudflat and exposed shoreline around the edge of the lake.

Table F.2.1. Lake elevations recorded on Valentine NWR, 2012. For all lakes, average spring elevations are based on the highest elevation recorded in Mar-May from 1988-2003, and the average fall elevations are based on the lowest elevation recorded in Aug-Oct from 1988-2003. No elevations were recorded in 2004. From 2005-2011, spring and fall elevations are based on one reading taken in April, and one reading taken in September or October.

Lake	Spring 2012	Fall 2012	Spring Average	Fall Average
Clear	2916.6	2913.55	2916.82	2915.92
Dewey	2923.48	2921.44	2924.27	2923.19
Hackberry	2925.14	2923.16	2924.37	2923.74
Pelican	2942.9	2940.94	2942.61	2941.99
Watts	2923.8	2920.61	2923.73	2922.74
Whitewater	2927.88	2925.50	2928.19	2927.40
Willow*	2913.88	2911.04	2911.44	2910.63

\* Average elevations for Willow Lake are only from readings taken after 1997, when the water control structure washed out.

There are 32 ground water monitoring wells located on and adjacent to Valentine NWR. These wells were established in the 1950's by the USDI-Geological Survey, and have been monitored twice annually by refuge staff since 1970.

USGS well readings were completed and sent to the USGS office in Lincoln. Chevelle Schreiner (cschreiner@usgs.gov) has taken over the position of collecting well data from remote locations. All 2012 data collected on Valentine NWR have been sent to Ms. Schreiner. The spring groundwater levels were about 8 inches above spring averages in April. Twenty two of the 31 USGS wells had elevations greater than average for the spring. As with lake elevations, the summer drought caused a substantial drop in groundwater levels by Sept. Twenty six of the 31 wells had elevations lower than fall averages, and wells were down by an average of 9.8 inches. Groundwater levels do generally fall from the spring to late summer, by an average of 8.86 inches. In 2012, the average difference between spring and fall represented a drop of 26.32 inches.



Table F 2.2. Spring and fall USGS groundwater well readings, and the spring and fall averages as recorded from 1970-2012. Groundwater elevation is given for all wells for which the elevation is known. For wells that the elevation is not known, an index value based off of 100' is used.

Well No.	Well Location	Spring	Spring Ave	Fall	Fall Ave
1	N. East Long	2875.83	2874.65	2871.83	2873.40
2	SE corner S. Marsh	2895.53	2894.72	2892.13	2893.22
3	SE corner Pony	2899.37	2899.51	2895.77	2897.52
4	SE corner Cow	plugged	2919.43	plugged	2918.56
5	Calf Camp & Hwy 83	2896.35	2896.39	2893.15	2895.13
6	Calf Camp West	2915.33	2915.56	2912.33	2913.73
7	Little Hay West	2917.34	2916.19	2915.54	2916.09
8	Little Hay & Hwy 83	2898.68	2899.23	2896.68	2898.17
10	W. Pony & Hwy 83	2925.31	2923.09	2921.11	2922.57
13	S. Willow	2918.65	2917.25	2916.45	2917.11
14	E. McKeel	2921.57	2920.30	2917.97	2919.13
15	S. East Sweetwater	2926.57	2925.28	2924.27	2924.74
16	SE Trout	2900.07	2898.92	2896.77	2897.58
17	E. Crowe Headquarters	98.6	95.77	98.7	95.77
20	S. Watts	2925.76	2924.79	2922.66	2924.09
21	E. Pony Pasture	2925.84	2924.91	2923.54	2924.41
22	Hackberry-Dewey Canal	2923.59	2923.74	2922.09	2923.02
23	Badger Bay	2923.99	2923.74	2922.69	2923.77
25	E. Pelican	2942.52 <sup>a</sup>	2943.46	2942.52 <sup>a</sup>	2943.22
26	E. West Long	2965.78	2964.97	2963.48	2964.89
27	Dad's Recreation Area	2957.19	2957.46	2956.89	2956.35
29	NW Pelican	2948.69 <sup>a</sup>	2948.40	2948.69 <sup>a</sup>	2947.67
30	S. Dewey Marsh	2940.64	2940.44	2938.94	2939.39
31	W. Dewey Marsh	95.8	97.82	95.7	98.11
32	N. Pelican	2942.15	2941.66	2939.55	2940.89
33	NW West Long	2980.7	2979.77	2977.5	2978.85
34	Hwy 83 & W. King Flats	2926.39	2924.25	2923.39	2924.01
35	SE "21" Lake	97.5	96.37	93.9	95.49
36	W. Sweetwater & Hwy 83	2927.17	2926.95	2927.17	2926.38
38	SE West Twin	2921.04	2920.57	2918.74	2919.81
39	SW Hassle Place	96	94.55	94 <sup>a</sup>	94.19

<sup>a</sup> These wells held no water, only damp sand at the bottom.

The annual Valentine NWR water use report for 2011-2012 was completed and signed in April. This report provides information on water measurements taken on the refuge during 2011, and describes planned water management for 2012. Summary data on lake level measurements and USGS groundwater monitoring

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wells is provided, as well as planned water use activities for the year (report found in C:\Documents and Settings\nennemanm\My Documents\mel\Work files\USGS wells and lake levels\water use reports).

### 3. Forests

On July 3 the small aspen grove by Dewey Marsh was checked. The grove was part of a prescribed burn conducted on May 9. The grove was mostly large trees before the burn. These trees looked stressed with many dead leaves on the lower branches. The leaves towards the tops were green (Fig 3.1). Several looked dead. There were many aspen sprouts throughout the grove (Fig 3.1). Hopefully they will make it and keep the grove going. I have never seen many sprouts in the grove before. This is one of 2 remnant aspen groves on the refuge.



Figure 3.1. Aspen grove in HU 2B3D in early July, showing the effects of a prescribed burn on May 9, and the subsequent drought.



Figure 3.2. Photo at ground level of aspen grove in HU 2B3D showing some of the aspen sprouts that came up following the May 9 prescribed fire.

Special use permits were issued to 2 individuals to cut cedar trees from the tree row along the Watts Lake West End Access Road. About 50 trees were removed and will be used for posts. Hopefully we can get more people interested in this. Four commercial loggers were contacted but were not interested in the trees. Cedar tree rows and groves are a seed source for cedars invading the prairie.

## 5. Grasslands

The native prairie on Valentine NWR was recognized in 1979 with the designation of the refuge as a Registered National Landmark. Four range sites are recognized within the refuge boundaries, each contributing to the diversity of the grassland. Wetland range sites are characterized by prairie cordgrass, blue-joint reed grass, sedges, goldenrods, saw-toothed sunflowers, and willows. The threatened western prairie-fringed orchid is also found in some of these wetland range sites.

Sub-irrigated range sites are located where the water table is near the soil surface. These areas support grasses more characteristic of the tallgrass prairie. Dominant species found in these areas include switchgrass, Indian grass, and big bluestem. Many of our problem

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plant species occur in these sub-irrigated range sites. Kentucky bluegrass, smooth brome, leafy spurge, and Canada thistle are all most prevalent here.

Sand range and low sand range sites are on lower and gently sloping hills, and are covered with native cool and warm season grasses characteristic of the mixed-grass prairie. Needle and thread, porcupine, June, western wheat, prairie sandreed, sand bluestem, sand lovegrass, little bluestem, and switch grass are prevalent on these sites. Many forbs are also found here at varying abundance and visibility depending on climatic conditions.

Choppy range sites are the high dunes that gave the Sandhills their name. These hills are generally vegetated, but may be subjected to wind erosion resulting in a blowout. These blowouts are habitat for blowout grass and the endangered blowout penstemon. Predominant grasses in the “choppies” are blue grama, sand bluestem, prairie sandreed, sand lovegrass, sandhills muhly, and little bluestem.

Grassland management goals are to preserve, restore, and enhance the ecological diversity of indigenous flora of the Sandhills prairie. Management to meet this goal is accomplished through disturbance with grazing, haying, and fire, and rest.

## **7. Grazing**

Three units that were burned by wildfire or prescribed fire were grazed and should prove interesting as burn/graze combinations.

The continued drought affected refuge grasslands. In summer, the hills were mostly brown but there was good grass growth in the meadows. Habitat units grazed in June, July, and August showed little to no re-growth. Areas that were prescribed burned this spring were green most of the summer but turned brown especially on the south facing slopes.

We received 9 requests for grazing or haying on the refuge or easements due to drought and wildfire. Six requests were denied. One permittee was given some additional grazing in 2 units where the grazing will benefit wildlife habitat (mostly dense stands of cattail). One rancher was allowed to mow the road ditches on several refuge roads and keep the hay. This actually saves us having to do the mowing. We tried to get ranchers to do this in the past but no one was interested. With hay going for up to \$200 per ton it may now be feasible for ranchers to mow our road ditches for a portion of the hay.

Requests for grazing and haying have come up in the past during drought and we have always stuck with "if it doesn't benefit wildlife habitat, we will not do it." We also state in our special use permits that grazing may be reduced due to drought or other conditions. We have never done this. We also need to consider that if we permit some, we will surely get more requests than we can fill and that the drought may continue for a number of years.

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Trespass cattle were on the refuge on many occasions. Due to the drought forage is grazed down all around the refuge and cattle are pushing through the fences to get at the refuge grasses. In places wetlands that are part in and part out of the refuge have dried out. The fences are rusted and down in some of them allowing cattle to access the refuge. There is about 100 miles of boundary fence on the refuge. We brought back the fence contractor in the fall to make repairs in the boundary fence. A list of the known instances of trespass cattle follow. Neighbors have been mostly cooperative in removing the cattle and doing some fence repair.

We had trespass cattle in Habitat Unit 32C1. The cattle were on the refuge for a short time only and entered through a gap in the boundary fence in a dried up wetland. Cattle were also in on the north side of East Long Lake but only for a short time. We had small numbers of trespass cattle in on the refuge at E. Long Lake, Unit 37, and Unit 4. Owners were contacted and the cattle removed. Small numbers of cattle got on to the refuge by Duck and Marsh Lakes. In one case a gate was left open and the other the cattle crossed a bad fence in a wetland.

In 1985 the refuge habitat management program was changed and short-duration grazing started. Prior to 1985, much of the refuge grassland was grazed on a six week rotation. Authorized AUMs for each of the permittees have remained about the same when compared to 1997 levels. The number of permittees has declined over the years. This year we had 4 grazing permittees. One permittee ran 2 herds last year but only had one this year.

Grazing rates are reduced to compensate permittees for the added expense of moving cattle for short duration grazing. The program was similar to previous years with emphasis on spring grazing treatments in meadows and short-duration grazing in hill units.

**Grazing fees for 2012 were:**

spring grazing treatment	\$23.30/AUM
short-duration grazing	
1 day in unit	\$15.98/AUM
2 days in unit	\$21.48/AUM
3 days in unit	\$23.30/AUM
4 days in unit	\$24.04/AUM
5 days in unit	\$24.40/AUM
6 days in unit	\$24.77/AUM
7 days in unit	\$26.14/AUM
8 or more days	\$26.60/AUM
in unit	
fall	\$26.60/AUM
winter	\$26.60/AUM
(for feeding refuge share of hay on refuge at 3AUMs/ton)	



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The full rate of \$26.60 for 2012 is an increase of \$1.00 per AUM from the 2011 fee and is based on a rate survey conducted by USDA and published in Nebraska Farm Real Estate Market Developments. The different classes of animals were also changed in 2003 and we now use the US Department of Agriculture Statistics Board conversion factors. Mature cow stayed at 1.00; mature cow with nursing calf went from 1.25 to 1.32; yearling went from .75 to .70; bulls from 1.00 to 1.50; and horse from 1.00 to 1.20.

Permittees also had their grazing bills reduced for weed control, and improvements and repairs to wells, fence, tanks and other facilities needed for the program. In 2012, \$68,848 was spent on improvements and deducted from final billings. Permittees were required to hire a contractor to repair fences in the units they used. Basically two fence contractors were hired and they split the fence repair for the four permittees. They were paid \$40.00 per hour for a crew of two, and supplied their own gas, tools, vehicle, and equipment. Total fees collected for the 2012 grazing season were \$33,350.

The methods and expected results for the different grazing strategies are explained below. The acreage of grassland treated with each type of grazing is listed in Table F7a.

a. **Spring Grazing Treatment**

Spring grazing treatment (SGT) is done before the end of May on sub-irrigated meadow sites. The cattle are in the unit for greater than two weeks. Cattle eat or trample almost all of the residual cover. They also over graze and thus reduce undesirable cool season exotic grasses (Kentucky bluegrass and brome). Cattle can be placed in a unit to remove residual and then brought back in later to hit the cool season exotics. In some instances, cattle are brought back in at several later dates for the same purpose. Because much of the feed is in the form of old mat, this treatment is best done by fall calving cows and not by lactating spring calving cows. Meadows that are hayed are also sometimes given this treatment to add fertilizer.

Dramatic results occur with this treatment. Exotic cool seasons, such as Kentucky bluegrass, are suppressed and native warm seasons, such as switch grass, increase in vigor and density. The disadvantage is the loss of the unit for nesting in the year of treatment and a lower waterfowl nesting density in the following year. Often the unit can however be rested for up to five years following treatment. In 2012, 19 habitat units totaling 3,654 acres received a spring grazing treatment and included some areas that were later hayed.

b. **Spring Short-duration Grazing**

Spring short-duration grazing (ES-SD) is grazing a unit for less than two weeks during May. Generally the cattle are in the unit for only three to five days. This type of grazing is generally done in hill units to stimulate growth of grasses, especially cool seasons. The short exposure times eliminate overgrazing. In 2012, 3 habitat unit totaling 602 acres had spring short-duration grazing. Where possible units grazed later in summer the previous years are grazed using this treatment. This both varies treatment and reduces disturbance

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to nesting cover. Most units grazed with ES-SD show excellent growth by fall.

c. **Short-duration Summer Grazing**

Short-duration summer grazing (SD-S) is done from June 1 through September 1. Cattle are in a unit for less than two weeks. Most units are grazed only three to five days and the cattle moved on to the next unit. Electric fences are used to break up larger units and increase stock density. Most short-duration summer grazing was completed by mid-July. In 2012, 46 habitat units totaling 10,370 acres were short-duration summer grazed. Units grazed in this method show good growth by fall if there is adequate moisture. If little or no late summer rainfall is received, as was the case this year, re-growth is less, especially in those units grazed in late July or August.

d. **Summer Grazing**

Summer grazing (S) is done from June 1 through September 1 and cattle are in the unit for two weeks or longer. In 2012 no habitat units were summer grazed. When we do summer grazing it is usually in larger units which have not been cross fenced.

e. **Fall Grazing**

Fall grazing (F) is done from September through November. Fall grazing can reduce mulch accumulations, add fertilization, and maintain grouse leks. If done at the proper time cattle will also graze out small wetlands and leave the surrounding upland vegetation alone. Generally the wetlands have green in them while the uplands have only cured grasses. Grazing in the wetlands recycles nutrients and provides pair habitat for ducks in the spring. Generally we have moved away from fall grazing. Fall grazing eliminates both winter cover and nesting cover in the following year. Some units were fall grazed in 2012 that will be given a spring grazing treatment in 2013. In 2012, 5 habitat units totaling 1,085 acres were fall grazed.

f. **Winter Grazing**

Winter grazing (W) is done during the November through April period. In winter grazing, cattle are fed hay on a feed ground in a unit. The hay comes off the refuge. When the weather is harsh the cattle feed on hay but when it is nice they graze away from the hay ground. Units with a history of winter grazing combined with feeding also have excellent growth of grasses away from the feedlot. This is due to the import of energy in the form of fertilizer. Hay is cut in the meadows. Resident wildlife also utilizes waste grain from the feeding operation. In 2012, 5 habitat units totaling 260 acres were winter grazed.

g. **Fire**

Prescribed fire (P) and natural or wildland fire (N) are discussed in the fire section H-9.

<b>Table F 7a. 2012 HABITAT MANAGEMENT SUMMARY</b>				
<b>Treatment</b>		<b>Units</b>	<b>Acres</b>	<b>AUMS</b>
<b>Rest</b>	rest (R)			----
<b>Spring</b>	spring grazing treatment (SGT)	19	3,654	908
	early spring short duration (ES-SD)			
	ES-SD 1-6 days	3	602	53
	ES-SD 7-10 days	0	----	----
<b>Summer</b>	short duration summer (SD-S)			
	SD-S 1-3 days	7	667	141
	SD-S 4-7 days	38	9,293	1,573
	SD-S 8-14 days	1	410	142
	summer (S) 15-27 days	0	----	----
<b>Fall</b>	fall (F)	5	1,085	348
<b>Winter</b>	Winter (W)	5	260	
<b>Hayed</b>	hayed (H)	10	775	----
<b>Fire</b>	prescribed fire (P)	11	2,912	----
	natural fire (N)	14	799	----
<p>*Note: some habitat units received double treatment, primarily hayed units that were also spring grazed (SGT) or fall (F) grazed units, or rest (R) units that had N or P fires.</p>				

### Vegetation Monitoring

Background and methods: Grazing is the primary grassland management tool on Valentine National Wildlife Refuge. Grazing treatments are generally geared toward maintaining the growth and vigor of native grasses and forbs, while suppressing non-native grasses (see discussion of grazing treatments). In the Valentine NWR CCP, specific grassland structure objectives are provided for both upland and meadow habitat types, in both grazed, hayed, or burned (disturbed cover) and rested units. In uplands, the acceptable range for visual obstruction readings (VOR) is 1-10", with an average of 3" for grazed units. In units rested for 1 or more years, the range goes to 1-18", with a mean greater than 6". For grazed meadows, the desired VOR range is again 1-10", with a 3" average. In meadows with one or more years of rest, the VOR range increases to 2-24", with an average of 10-12". The CCP also provides some recommendations for the amount of treatment (disturbance) for uplands and meadow. In the 48,755 acres of upland, the CCP suggests that about 45% of those acres (21,939 ac) should be grazed, mowed or burned. For the 13,106 meadow acres, about 40% (5,242 ac) should be disturbed on an annual basis. These guidelines provided for about 50% of the refuge acres remaining as undisturbed cover. Recommended composition of plant cover for subirrigated meadow is 75-85% grass, 5-10% grass-like plants, 5-10% forbs, and 5% shrubs. In sands and choppy sands range sites (uplands), guidelines for plant species composition include providing 80-95% grass, <5% grass-like plants, 10% forbs, and less than 5% shrub cover.

In an effort to determine if these objectives were being met, 202 random transects were established in 2003 across Valentine NWR to monitor vegetation. The monitoring protocol uses 30-m transects randomly placed within habitat units. To ensure that



sampling points were well distributed, the refuge was stratified into seven management areas (Fishing Lakes, Wilderness, Hay Flats, Marsh Lakes, Pony Lake, King Flats, and East End), and a grid system was placed over each area. The grid system was used to locate random points for the start of each transect. Since vegetation differs between aspects (Bragg 1998), transects were stratified by aspect (NE facing, SW facing, hilltop, swale or interdunal flat). Once the random point was reached in the field, the nearest appropriate aspect (in the order NE, SW, hilltop, interdunal flat) was selected. On NE and SW facing slopes, transects were placed perpendicular to and across the middle portion of the slope. For hilltops and flats, a random compass bearing determined the transect direction. To avoid disturbance caused by cattle or bison rubbing on the transect marker, vegetation measurements start 15-m away from the marker (the corner of the Daubenmire frame sits at 15-m, 30-m, and 45-m from the marker). On each transect, plant species composition and cover was assessed in three, 1-m x 0.5-m vegetation frames (Daubenmire 1959). Vegetation frames were placed on the right side of the tape, with an exception for transects on slopes, where frames were placed on the downhill side of the tape. Within the vegetation frame, each plant species was identified and assigned a percent cover value (1 = <1%, 2 = 2-5%, 3 = 6-15%, 4 = 16-25%, 5 = 26-50%, 6 = 51-75%, 7 = 76-95%, and 8 = >95% [Modified from Elzinga et al. 1998]). Vegetation visual obstruction (Robel et al. 1970) and litter depth were measured at the center of each vegetation frame. Litter depth was recorded to the nearest centimeter with the following exceptions: if the measuring dowel was resting on bare ground, a zero was recorded. If the dowel was resting on or in contact with horizontal vegetation from a previous year's growth, but the total accumulation was <0.5 cm, a half-centimeter was recorded. A measure of vegetation disturbance (grazing or fire) was also recorded within each vegetation frame. Disturbance by fire was described by the percent of the plot burned using the cover values described above. Additionally, plant groups (Appendix A) were identified within a narrow belt (0.1 m) at every half-meter interval along the 30-m transect (Grant et al. 2004). This methodology provides two measures of plant composition for each transect – percent cover within three Daubenmire frames on each transect, and frequency of plant group occurrence on the belt transects. The two methods provide slightly different results, but provide data on plant composition that can be related to CCP objectives. Daubenmire frames tend to have more forb cover recorded as the leaves of forbs tend to be broader than grasses, whereas the narrower belt transects tend to put more focus on the dominant grass cover. One hundred fifty-six transects were located in upland (sands and choppy sands) sandhills units, and 46 were located in subirrigated meadow units. To improve the sample size in meadows, an effort was made to target sampling in meadows that had received SGT, so in 2009, several additional transects were selected in the same manner as the original 2003 transects (grid overlays and random selection of x-y coordinates). These transects were then located in the field, but fiberglass posts were not left as markers on these new transects. GPS coordinates should allow these transects to be revisited in the future, although the placement will not be as exact as if the start and end posts were left in place. The new transects will allow for a better assessment of the current year grazing treatments. Collectively, these transects were designed to monitor long-term vegetation changes and to gauge if refuge management objectives are being met.

Results and Discussion: In 2012, 112 of the 202 permanent transects were completed, with 91 transects in hills units, and 21 in meadow units (Table 7.1). Selection of transects began by overlaying transect points on the 2012 grazing map, and transects falling into grazed or burned units were selected. Once the grazed (disturbed cover) transects were selected, a sample of transects in nearby rested units was selected to minimize travel time while in the field. Grazed units in both hills and meadows reflected VOR that were greater than CCP objectives, while VOR in rested units in both habitats were lower than objectives, although rested meadows were barely lower than the 10" objective (Table 7.2). Another way to look at vegetation height is to consider the percentage of the VOR falling into different height categories. For hill units, most of the VOR for disturbed units (burned, grazed) were dominated by readings <3". In rest units, most of the readings were in the 3-6" category, with about 17% of the readings greater than 6" (Figure 7.1). In meadow units, the mean VOR was somewhat lower in disturbed units than in rested units, and this is reflected in the percent VOR by height category (Figure 7.2). In the disturbed meadows, 62% of the readings were 3-10", while in rested units only 44% of the readings were in this category, with 29% and 23% of readings falling into the 10-12" and >12" range, respectively. In disturbed meadow units, the percentages were 18% and 8% for these higher categories.

The total amount of disturbed cover (e.g. grazed, burned, hayed) on the refuge was higher than objective levels for meadows, but considerably lower than objectives listed for hills. In uplands, the CCP objective is to graze or burn approximately 45% of the total upland acres. In 2012, about 28% of these acres were grazed or burned. In meadows the objective is about 40% disturbed cover, and in 2012 about 47% of these acres were grazed, hayed, or burned. Since the CCP was written and approved, it has become much easier to rest habitat units on the refuge as the number of permittees using the refuge has dwindled. Between 1986 and 1997, the number of permittees dropped from 13 to 9, and the AUM usage dropped from approximately 9,000 to 6,000 AUM. In 2012, only 4 permittees grazed cattle on the refuge, and AUM usage was 3,183.

Percent cover values measured by the Daubenmire frame and on belt transects indicate that these values are similar to CCP objectives for both habitat types. In the hills, percent grass cover is slightly less than objective levels, and percent grass-like slightly more than objectives, with forb and shrub cover at objective levels (Table 7.2). In meadows, percent grass cover (especially as measured by Daubenmire frame) is much lower than objective, while percent grass-like is much higher. Belt transect data do not allow grasses and grass-like plants to be easily separated. Forbs and shrubs are again near CCP objectives.

Dry native warm season grasses (category 32, Appendix 1) and dry cool season natives (category 31) comprised most of the plant cover recorded on belt transects in hill units (means of 55% and 25%, respectively). Kentucky bluegrass (category 41) was recorded on 8.8% of upland transects, with a mean occurrence of 3% (range 0-75%), and was found most often in interdunal flats and on hilltops. On meadow transects cover consisted primarily of meadow (category 34, 41%), mesic warm season grasses (category 33, 22%), and Kentucky bluegrass (17%). The only obvious difference in percent cover

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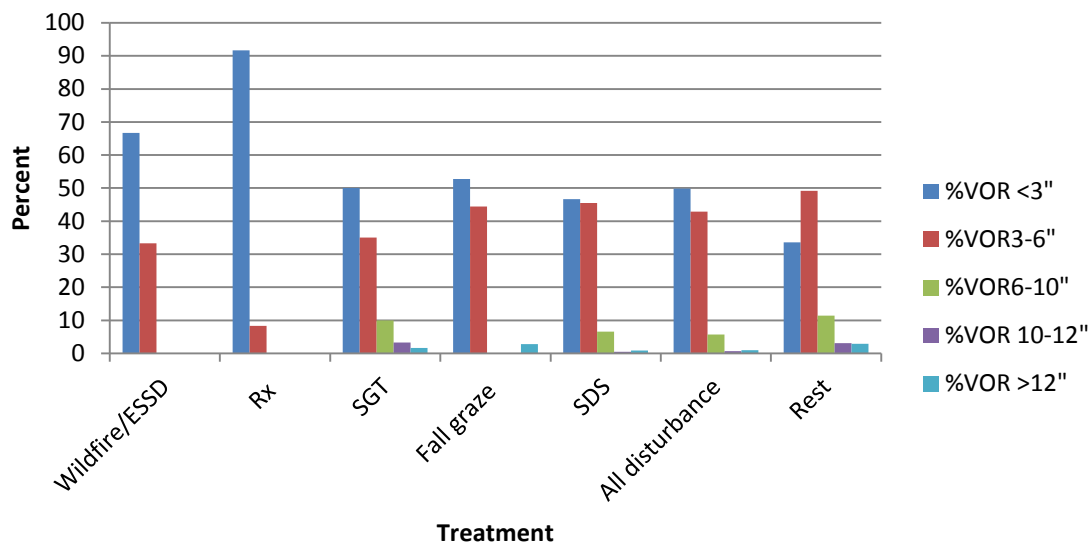
between treatments was in the mesic warm season grasses and Kentucky bluegrass: in SGT the warm season grasses were 23% and Kentucky bluegrass 5%, while in rested units these values were 11% and 21%, respectively.

With the hot and dry conditions experienced during the summer months, it is not surprising that VOR in rested units were lower than our CCP objectives. Many of the warm season grasses in the hills did not produce flowering stems in 2012, and those that did produced shorter stems. Much of the vegetation was very dry when VOR were measured, which probably also led to somewhat lower readings. Given the dry conditions, the vegetation conditions are relatively good. In subirrigated units, it appears that dry conditions may have impacted Kentucky bluegrass, as the percent occurrence recorded on belt transects dropped from 56% in 2011 to only 17% in 2012, although Kentucky bluegrass was still the dominate species recorded on several transects.

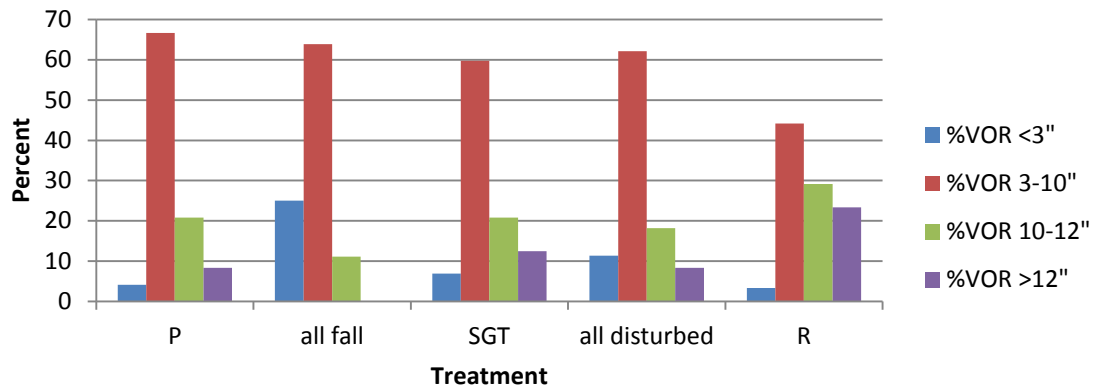
Table 7.1. Transect sample size by slope and aspect by treatment for hill units, and sample size for meadow units by treatment, for transects completed in 2012.					
HILLS	Aspect				
Treatment	NE	SW	Hilltop	Interdunal	Total
ESSD	1	0	1	0	2
SDS	10	12	8	7	37
Rest	10	9	10	9	38
SGT	1		2	2	5
SGT + Fall	1	1			2
Rest + Fall				1	1
N + ESSD		1		1	2
Rx Fire	1	1		2	4
MEADOW					
Rest					10
SGT					6
Rx Fire					2
Rest + Fall					2
SGT + Fall					1

Table 7.2. Vegetation sampling on Valentine NWR in 2012, with values compared to CCP objectives. VOR values for the 2012 sample are means (range), in inches. Percent cover values shown are results from Daubenmire frame, results from belt transect.			
		CCP objective	2012 Sample
Hills	VOR Grazed	3" (1-10")	3.1" (0-20")
	VOR Rest	>6" (1-16")	4.2" (0-24")
	Disturbed acres	21,900 ac	13,490 ac
	% cover grass	80-95%	74%, 85%
	% cover grass-like	<5%	10%, NA
	% cover forb	10%	10%, 2%
	% cover shrub	<5%	6%, 3%
Meadow	VOR Grazed	3 (1-10")	7.9" (1-46")
	VOR Rest	10-12"(2-20")	9.7" (0-24")
	Disturbed acres	5,200 ac	6,162 ac
	% cover grass	75-85%	61%, 93%
	% cover grass-like	5-10%	27%, NA
	% cover forb	5-10%	11%, 5%
	% cover shrub	5%	1%, 1%

**Figure 7.1 Percent of VOR readings by treatment for hill units on Valentine NWR, fall 2012**



**Figure 7.2 Percent of VOR readings by treatment for meadow units on Valentine NWR, fall 2012**



[Type text]

## Appendix 1. Plant associations used for belt transects in fall 2010.

### Fort Niobrara-Valentine Upland Plant Associations (Belt Transect) September 22, 2010

#### **NATIVE SHRUB and TREE TYPES**

##### **low shrub (generally <1.5m tall)**

- 11 Yucca
- 12 Western sandcherry
- 13 Poison ivy
- 14 Rose
- 15 Leadplant
- 16 Other (e.g. Snowberry, skunkbrush sumac, buffalo currant, dogwood, cactus, etc.) – user defined

##### **tall shrub/tree (generally >1.5m tall)**

- 21 Chokecherry, wild plum
- 22 Smooth sumac
- 23 False indigobush, sandbar willow, meadow willow
- 24 Cottonwood, peachleaf willow
- 25 American elm, green ash, hackberry, box-elder, ironwood
- 26 Bur oak
- 27 Ponderosa pine

#### **NATIVE GRASS-FORB TYPES \***

*a* = <10% non-native/invasive or *b* = 10-25% non-native/invasive followed by non-native/invasive plant code

- 31 Dry cool season (sedges, need-and-thread, prairie junegrass, western wheatgrass, forbs)
- 32 Dry warm season (little bluestem, sand bluestem, prairie sandreed, grama sp., forbs)
- 33 Mesic cool-warm season mix (big bluestem, switchgrass, Indiangrass, wildrye, forbs)
- 34 Meadow (reedgrass, prairie cordgrass, foxtail barley, wet sedges)
- 35 Wetland; robust emergent vegetation or open water (cattail, bulrush, phragmites)
- 36 Clubmoss/lichen
- 37 Forbs

#### **NON-NATIVE, INVASIVE OR PLANTS OF MANAGEMENT CONCERN \***

*c* = 25-60% non-native/invasive or *d* = >60% non-native/invasive followed by native grass-forb code

- 41 Kentucky bluegrass
- 42 Smooth brome
- 43 Cheat grass
- 44 Reed canary grass
- 45 Phragmites
- 46 Other grass – user defined
- 47 Leafy spurge
- 48 Canada thistle
- 49 Sweet clover
- 50 Other forb – user defined
- 51 Eastern red cedar
- 52 Locust (honey, black)
- 53 Russian olive
- 54 Other shrub/tree – user defined
- 55 Non-native mix

#### **OTHER**

- 91 barren, unvegetated (bare soil, gopher mound)
- 92 other (rock, manure, hole, ant hill)

\* Use sub-code (*a*, *b*, *c*, or *d*) only if “non-associated” plant type is present in the belt segment. (e.g. 33a41; 43c32)

[Type text]

## **8. Haying**

About 775 acres of sandy, sub-irrigated, and wetland range sites were mowed and yielded 786 tons of hay. All or parts of 10 habitat units were mowed and hayed.

The method of charging for permittee hay was changed in 2001. Now hay is put up on a 50/50 split with the permittee taking half home and feeding the other half back on the refuge at the full rate of \$26.60/AUM in the winter treatment. We also hayed one unit on a 50/50 split where we kept half of the hay for road hay and to feed horses at Ft. Niobrara NWR. Some small bales were also hauled up to Ft. Niobrara NWR. These were cut on a 50/50 split.

A cooperatoor mowed the ditches of several refuge roads for a split on the hay. The refuge received 26 large bales and the rancher 52 bales. We have tried to get people to do this in the past but no one was interested. It saves us mowing the road ditches. Hay is in short supply and very expensive now due to the drought which has made mowing ditches more attractive.

Most of the meadows hayed are also grazed either in the fall or spring. This adds fertilization to the meadows and improves the quality and quantity of hay produced. In general we try to mow low sites with mostly reed and cord grasses.

Haying is used to provide fire protection for facilities, browse areas for Canada geese, sandhill cranes, prairie grouse, and deer and to provide hay to Fort Niobrara NWR. Mowing can also open up small wetlands for waterfowl pair habitat. Hay is also used in the winter treatment described under the grazing section of this report.

Areas to be hayed, in which we have found the endangered prairie white-fringed orchid in the past, were searched on foot. Searches were done when the plant was in bloom. Plants found were marked with lathe with orange tops and they area not mowed. Haying may be of some benefit to the orchid as some of the plants found on the refuge are in areas that are annually hayed.

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Page No.  
07/26/13

1

# 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	am/ acre	permittee
01A1	105	R	0	0	0	0	/ / /	0	0.00	0.00	
01A2	110	R	0	0	0	0	/ / /	0	0.00	0.00	
01A3	10	R	0	0	0	0	/ / /	0	0.00	0.00	
01A4	115	R	0	0	0	0	/ / /	0	0.00	0.00	
01A5	74	R	0	0	0	0	/ / /	0	0.00	0.00	
01B1 (NW)	45	R	0	0	0	0	/ / /	0	0.00	0.00	
01B1 (W-E)	63	R	0	0	0	0	/ / /	0	0.00	0.00	
01B2	376	R	0	0	0	0	/ / /	0	0.00	0.00	
01C	188	R	0	0	0	0	/ / /	0	0.00	0.00	
02A	506	R	0	0	0	0	/ / /	0	0.00	0.00	
02B1	176	R	0	0	0	0	/ / /	0	0.00	0.00	
02B1 (FDX)	5	PF5	0	0	0	0	/ / /	0	0.00	0.00	
02B2	45	PF45	0	0	0	0	/ / /	0	0.00	0.00	
02B3 (A)	140	PF140	0	0	0	0	/ / /	0	0.00	0.00	
02B3 (B)	129	PF129	0	0	0	0	/ / /	0	0.00	0.00	
02B3 (C)	150	PF150	0	0	0	0	/ / /	0	0.00	0.00	
02B3 (D)	65	PF65	0	0	0	0	/ / /	0	0.00	0.00	
03A	106	R	0	0	0	0	/ / /	0	0.00	0.00	
03B	240	R	0	0	0	0	/ / /	0	0.00	0.00	
03C1	268	R	0	0	0	0	/ / /	0	0.00	0.00	
03C1 (W)	21	R	0	0	0	0	/ / /	0	0.00	0.00	
03C1 (DKE)	29	R	0	0	0	0	/ / /	0	0.00	0.00	
03C2	137	SD-S	0	190	0	0	06/27/12	5	31.64	0.23	MILLER
03D	516	R	0	0	0	0	/ / /	0	0.00	0.00	
04	190	SD-S	0	193	0	0	07/02/12	5	31.64	0.09	MILLER
05A	666	PF666	0	0	0	0	/ / /	0	0.00	0.00	
05B1	527	PF527	0	0	0	0	/ / /	0	0.00	0.00	
05B2	30	R	0	0	0	0	/ / /	0	0.00	0.00	
06	308	R	0	0	0	0	/ / /	0	0.00	0.00	
07A1 (N)	225	R	0	0	0	0	/ / /	0	0.00	0.00	
07A1 (S)	85	R	0	0	0	0	/ / /	0	0.00	0.00	
07A2	20	R	0	0	0	0	/ / /	0	0.00	0.00	
07B1	112	R	0	0	0	0	/ / /	0	0.00	0.00	
07B2	152	R	0	0	0	0	/ / /	0	0.00	0.00	
07B3 (E)	25	R	0	0	0	0	/ / /	0	0.00	0.00	
07B3 (W)	66	R	0	0	0	0	/ / /	0	0.00	0.00	
07C	105	R	0	0	0	0	/ / /	0	0.00	0.00	
08A1	166	R	0	0	0	0	/ / /	0	0.00	0.00	
08A2	155	R	0	0	0	0	/ / /	0	0.00	0.00	
08A3	160	R	0	0	0	0	/ / /	0	0.00	0.00	
08B1/2	373	SD-S	0	355	0	0	06/25/12	6	69.54	0.19	COLBURN
08B3	155	SD-S	0	355	0	0	06/19/12	4	46.26	0.25	COLBURN
08B4	185	SD-S	0	355	0	0	06/15/12	4	46.56	0.25	COLBURN
09C1	275	R	0	0	0	0	/ / /	0	0.00	0.00	
09C2	175	R	0	0	0	0	/ / /	0	0.00	0.00	
09C3	170	R	0	0	0	0	/ / /	0	0.00	0.00	
09D1	120	R	0	0	0	0	/ / /	0	0.00	0.00	



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07/26/13

# 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	acres	acre	permitter
08D2	250 R	0	0	0	0	0	0	0	0.00	0.00	
08D3	134 R	0	0	0	0	0	0	0	0.00	0.00	
08E1	152 R	0	0	0	0	0	0	0	0.00	0.00	
08E2	117 R	0	0	0	0	0	0	0	0.00	0.00	
08E3(H)	100 R	0	0	0	0	0	0	0	0.00	0.00	
08E3(M)	187 R	0	0	0	0	0	0	0	0.00	0.00	
08F1	190 R	0	0	0	0	0	0	0	0.00	0.00	
08F2	211 SD-S	0	355	0	0	0	06/11/12	4	46.56	0.22	COLBURN
08G	206 R	0	0	0	0	0	0	0	0.00	0.00	
09A1/2/3	320 R	0	0	0	0	0	0	0	0.00	0.00	
09B1	153 R	0	0	0	0	0	0	0	0.00	0.00	
09B2	123 R	0	0	0	0	0	0	0	0.00	0.00	
09C1/2	160 R	0	0	0	0	0	0	0	0.00	0.00	
09C10	40 R	0	0	0	0	0	0	0	0.00	0.00	
09C3/4	160 R	0	0	0	0	0	0	0	0.00	0.00	
09C5	110 R	0	0	0	0	0	0	0	0.00	0.00	
09C6	90 SD-S	0	178	0	0	0	07/11/12	3	17.51	0.19	COLBURN
09C7	90 SD-S	0	177	0	0	0	07/11/12	3	17.41	0.19	COLBURN
09C8	70 SD-S	0	178	0	0	0	07/08/12	2	11.67	0.17	COLBURN
09C9	80 SD-S	0	177	0	0	0	07/08/12	2	11.61	0.15	COLBURN
10A1	640 SD-S	0	355	0	0	0	06/30/12	5	58.20	0.09	COLBURN
10A2	240 SD-S	0	355	0	0	0	07/03/12	3	34.92	0.15	COLBURN
10A3	160 SD-S	0	355	0	0	0	07/06/12	3	34.92	0.22	COLBURN
10B(C)	260 R	0	0	0	0	0	0	0	0.00	0.00	
10B(E)	275 R	0	0	0	0	0	0	0	0.00	0.00	
10B(R)	929 R	0	0	0	0	0	0	0	0.00	0.00	
11A1	126 R	0	0	0	0	0	0	0	0.00	0.00	
11A2	126 R	0	0	0	0	0	0	0	0.00	0.00	
11A3	118 SD-S	0	355	0	0	0	07/15/12	2	23.28	0.20	COLBURN
11A4	110 R	0	0	0	0	0	0	0	0.00	0.00	
11A5	126 R	0	0	0	0	0	0	0	0.00	0.00	
11A6	126 R	0	0	0	0	0	0	0	0.00	0.00	
11A7	114 SD-S	0	355	0	0	0	07/13/12	2	23.28	0.26	COLBURN
11A8	114 R	0	0	0	0	0	0	0	0.00	0.00	
12A1	83 R	0	0	0	0	0	0	0	0.00	0.00	
12A2	82 R	0	0	0	0	0	0	0	0.00	0.00	
12A3	83 SD-S	0	355	0	0	0	07/19/12	2	23.28	0.28	COLBURN
12A4	110 R	0	0	0	0	0	0	0	0.00	0.00	
12A5	80 R	0	0	0	0	0	0	0	0.00	0.00	
12A6	100 R	0	0	0	0	0	0	0	0.00	0.00	
12A7	110 R	0	0	0	0	0	0	0	0.00	0.00	
12A8	110 R	0	0	0	0	0	0	0	0.00	0.00	
12A9	82 SD-S	0	355	0	0	0	07/17/12	2	23.28	0.25	COLBURN
12B	290 R	0	0	0	0	0	0	0	0.00	0.00	
13A	709 SD-S	0	357	0	0	0	06/07/12	7	61.93	0.12	COLBURN
13B1	942 R	0	0	0	0	0	0	0	0.00	0.00	
14A1	250 R	0	0	0	0	0	0	0	0.00	0.00	

## 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C	G	adult	bull	yearling	outdate	days	ams	am/acre	permittee
14A2	294	R	0	0	0	0	0	0	0	0.00	0.00	
14A3	153	SGT	0	36	0	0	0	05/31/12	45	53.11	0.35	GOLBURN
14A4	200	SGT	0	47	0	0	0	05/31/12	45	69.34	0.35	GOLBURN
14B1	440	R	0	0	0	0	0	0	0	0.00	0.00	
14B2	340	SGT	0	81	0	0	0	05/31/12	45	119.51	0.35	GOLBURN
14B3	312	R	0	0	0	0	0	0	0	0.00	0.00	
14B4	260	R	0	0	0	0	0	0	0	0.00	0.00	
14B5	283	R	0	0	0	0	0	0	0	0.00	0.00	
15A	396	R	0	0	0	0	0	0	0	0.00	0.00	
15B	273	R	0	0	0	0	0	0	0	0.00	0.00	
15C1	193	R	0	0	0	0	0	0	0	0.00	0.00	
15C2	155	SD-S	0	193	0	0	0	07/12/12	3	18.98	0.12	MILLER
15C3	175	SD-S	0	193	0	0	0	07/17/12	5	31.64	0.18	MILLER
15C4	199	SD-S	0	193	0	0	0	07/23/12	6	37.97	0.19	MILLER
16A1	44	R	0	0	0	0	0	0	0	0.00	0.00	
16A2	95	R	0	0	0	0	0	0	0	0.00	0.00	
16A3	149	R	0	0	0	0	0	0	0	0.00	0.00	
16B1	160	R	0	0	0	0	0	0	0	0.00	0.00	
16B2	317	R	0	0	0	0	0	0	0	0.00	0.00	
16B3	40	R	0	0	0	0	0	0	0	0.00	0.00	
16B4	175	R	0	0	0	0	0	0	0	0.00	0.00	
16C	524	SD-S	0	193	0	0	0	07/09/12	7	44.30	0.08	MILLER
16E1	145	R	0	0	0	0	0	0	0	0.00	0.00	
16E2	71	R	0	0	0	0	0	0	0	0.00	0.00	
16E3	65	R	0	0	0	0	0	0	0	0.00	0.00	
16E4	266	R	0	0	0	0	0	0	0	0.00	0.00	
17	571	SD-S	0	193	0	0	0	06/22/12	7	44.30	0.05	MILLER
18A1	339	R	0	0	0	0	0	0	0	0.00	0.00	
18A2	163	R	0	0	0	0	0	0	0	0.00	0.00	
18A3	150	R	0	0	0	0	0	0	0	0.00	0.00	
18A4	220	R	0	0	0	0	0	0	0	0.00	0.00	
18A5	260	SD-S	0	193	0	0	0	06/15/12	4	25.31	0.10	MILLER
18A6	290	R	0	0	0	0	0	0	0	0.00	0.00	
18B1	81	R	0	0	0	0	0	0	0	0.00	0.00	
18B10	40	R	0	0	0	0	0	0	0	0.00	0.00	
18B2(H)	93	SD-S	0	193	0	0	0	06/11/12	3	18.98	0.20	MILLER
18B2(M)	83	R	0	0	0	0	0	0	0	0.00	0.00	
18B3(H)	112	R	0	0	0	0	0	0	0	0.00	0.00	
18B3(M)	95	H	0	0	0	0	0	0	0	0.00	0.00	MILLER
18B4(H)	103	R	0	0	0	0	0	0	0	0.00	0.00	
18B4(M)	42	R	0	0	0	0	0	0	0	0.00	0.00	
18B5	72	R	0	0	0	0	0	0	0	0.00	0.00	
18B6	69	R	0	0	0	0	0	0	0	0.00	0.00	
18B7(N)	76	R	0	0	0	0	0	0	0	0.00	0.00	
18B7(SE)	33	R	0	0	0	0	0	0	0	0.00	0.00	
18B7(SW)	55	R	0	0	0	0	0	0	0	0.00	0.00	
18B8	171	R	0	0	0	0	0	0	0	0.00	0.00	

Page No.  
07/26/13

4

## 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	sums	sum/acre	permitted
15B8(W)	36	R	0	0	0	0	/ / /	0	0.00	0.00	
15B9(H)	97	R	0	0	0	0	/ / /	0	0.00	0.00	
15R9(M)	41	R	0	0	0	0	/ / /	0	0.00	0.00	
15C1	216	R	0	0	0	0	/ / /	0	0.00	0.00	
15C2	149	R	0	0	0	0	/ / /	0	0.00	0.00	
15A	173	R	0	0	0	0	/ / /	0	0.00	0.00	
15B	174	R	0	0	0	0	/ / /	0	0.00	0.00	
15C	101	R	0	0	0	0	/ / /	0	0.00	0.00	
20A1	120	R	0	0	0	0	/ / /	0	0.00	0.00	
20A2	175	R	0	0	0	0	/ / /	0	0.00	0.00	
20A3	160	R	0	0	0	0	/ / /	0	0.00	0.00	
20A4	203	R	0	0	0	0	/ / /	0	0.00	0.00	
20B1	340	SGT	70	21	0	0	05/30/12	28	98.32	0.29	MILLER
20B2	185	SGT	36	11	0	0	05/30/12	28	50.75	0.27	MILLER
20B3(F)	127	R	0	0	0	0	/ / /	0	0.00	0.00	
20B3(W)	112	SD-S	148	45	0	0	06/05/12	3	22.33	0.20	MILLER
20B4	185	R	0	0	0	0	/ / /	0	0.00	0.00	
20B5	115	SD-S	148	45	0	0	06/02/12	3	22.33	0.19	MILLER
20B6	155	SGT	31	10	0	0	05/30/12	28	44.18	0.29	MILLER
20B7	40	SGT	8	3	0	0	05/30/12	28	11.75	0.29	MILLER
21A1(A)	295	R	0	0	0	0	/ / /	0	0.00	0.00	
21A1(B)	255	R	0	0	0	0	/ / /	0	0.00	0.00	
21A1(C)	188	R	0	0	0	0	/ / /	0	0.00	0.00	
21A1(D)	291	R	0	0	0	0	/ / /	0	0.00	0.00	
21A1(E)	120	R	0	0	0	0	/ / /	0	0.00	0.00	
21A2	134	SGT	0	32	0	0	05/31/12	45	47.21	0.35	COLBURN
21A3(F)	149	H	0	0	0	0	/ / /	0	0.00	0.00	COLBURN
21A4	179	H	0	0	0	0	/ / /	0	0.00	0.00	COLBURN
21B1	120	R	0	0	0	0	/ / /	0	0.00	0.00	
21B2	106	R	0	0	0	0	/ / /	0	0.00	0.00	
21B3	120	R	0	0	0	0	/ / /	0	0.00	0.00	
21B4	128	R	0	0	0	0	/ / /	0	0.00	0.00	
21B5	128	R	0	0	0	0	/ / /	0	0.00	0.00	
21B6	143	R	0	0	0	0	/ / /	0	0.00	0.00	
21B7	143	R	0	0	0	0	/ / /	0	0.00	0.00	
21C1	120	R	0	0	0	0	/ / /	0	0.00	0.00	
21C2	170	R	0	0	0	0	/ / /	0	0.00	0.00	
21C3	80	R	0	0	0	0	/ / /	0	0.00	0.00	
21C4	127	R	0	0	0	0	/ / /	0	0.00	0.00	
21C5	189	R	0	0	0	0	/ / /	0	0.00	0.00	
22A1	360	R	0	0	0	0	/ / /	0	0.00	0.00	
22A2	355	R	0	0	0	0	/ / /	0	0.00	0.00	
22A3	372	R	0	0	0	0	/ / /	0	0.00	0.00	
22A4	390	R	0	0	0	0	/ / /	0	0.00	0.00	
22B1	240	R	0	0	0	0	/ / /	0	0.00	0.00	
22B2	421	R	0	0	0	0	/ / /	0	0.00	0.00	
22B3	40	R	0	0	0	0	/ / /	0	0.00	0.00	

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Page No.  
07/26/13

# 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C.U.	adult	bull	yearling	outdate	days	acres	any	permitter	acre
22B4	90	R	0	0	0	0	/ /	0	0.00	0.00		
22B5	171	R	0	0	0	0	/ /	0	0.00	0.00		
23A1	160	ES-SD	0	162	0	0	05/15/12	4	21.25	0.13	COLBURN	
23A2	231	ES-SD	0	162	0	0	05/18/12	3	15.53	0.07	COLBURN	
23A3	211	ES-SD	0	162	0	0	05/21/12	3	15.93	0.08	COLBURN	
23B1	121	PF121	0	0	0	0	/ /	0	0.00	0.00		
23B1	121	SGT	0	79	0	0	05/11/12	10	25.90	0.21	COLBURN	
23B2	142	PF142	0	0	0	0	/ /	0	0.00	0.00		
23B2	142	SGT	0	81	0	0	05/31/12	10	27.21	0.19	COLBURN	
23C	549	R	0	0	0	0	/ /	0	0.00	0.00		
24A1	96	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN	
24A2/3/4	187	W	0	69	3	0	03/06/13	62	149.41	0.80	COLBURN	
24A2/3/4	187	W	148	69	0	0	03/20/13	14	115.23	0.62	COLBURN	
24A2/3/4	187	W	148	0	0	0	04/01/13	12	71.62	0.38	COLBURN	
24A2/3/4	147	W	125	0	0	0	05/03/13	32	161.31	1.10	COLBURN	
24A5/6	144	SGT	0	31	0	0	05/31/12	17	17.28	0.12	COLBURN	
24A7/8	134	SGT	0	31	0	0	05/11/12	17	17.25	0.13	COLBURN	
24A8	80	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN	
24C1	147	R	0	0	0	0	/ /	0	0.00	0.00		
24C2	97	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN	
24C3	97	SGT	0	62	0	0	05/14/12	14	28.46	0.25	COLBURN	
24C3	54	R	0	0	0	0	/ /	0	0.00	0.00		
24C4	82	H	0	0	0	0	/ /	0	0.00	0.00	COLBURN	
24C4	82	SGT	0	62	0	0	04/30/12	7	14.23	0.17	COLBURN	
25A	258	R	0	0	0	0	/ /	0	0.00	0.00		
25B	410	SD-S	240	0	10	0	07/21/12	14	142.19	0.35	LEE	
25C1	82	SD-S	120	0	5	0	07/07/12	6	30.51	0.37	LEE	
25C2	69	SD-S	120	0	5	0	07/07/12	6	30.51	0.44	LEE	
25C3	161	R	0	0	0	0	/ /	0	0.00	0.00		
25C4	200	R	0	0	0	0	/ /	0	0.00	0.00		
26A1	315	R	0	0	0	0	/ /	0	0.00	0.00		
26A2	349	R	0	0	0	0	/ /	0	0.00	0.00		
26B1	110	SGT	0	25	0	0	05/25/12	18	32.46	0.30	ANDERSON/G	
26B2	115	F	72	123	0	0	09/28/12	5	34.68	0.30	ANDERSON/G	
26B3	110	R	0	0	0	0	/ /	0	0.00	0.00		
26B4	125	R	0	0	0	0	/ /	0	0.00	0.00		
27A1	32	R	0	0	0	0	/ /	0	0.00	0.00		
27A2	267	H	0	0	0	0	/ /	0	0.00	0.00	ANDERSON/G	
27A2	267	F	72	123	0	0	10/10/12	12	83.24	0.31	ANDERSON/G	
27B1	57	R	0	0	0	0	/ /	0	0.00	0.00		
27B2	36	W	0	82	0	0	02/05/13	61	164.00	4.56	ANDERSON/G	
27B3	37	W	0	83	0	0	02/05/13	61	166.00	4.49	ANDERSON/G	
27B4	37	R	0	0	0	0	/ /	0	0.00	0.00		
28A1	155	SGT	72	0	0	0	05/26/12	10	29.04	0.18	LEE	
28A1/2	238	S	191	21	0	0	08/20/12	12	100.69	0.42	ANDERSON/G	
28A2	80	SGT	36	0	0	0	05/26/12	10	14.52	0.18	LEE	
28A3	80	R	0	0	0	0	/ /	0	0.00	0.00		

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# 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/C	adult	bull	yearling	outdate	days	ams	ams	permitter
unit									acre	acre	
25A4	65	R	0	0	0	0		0	0.00	0.00	
25A5	75	R	0	0	0	0		0	0.00	0.00	
25A6	80	R	0	0	0	0		0	0.00	0.00	
25B1	259	SGT	132	0	0	0	05/26/12	10	53.23	0.18	LEE
25B2	294	R	0	0	0	0		0	0.00	0.00	
25B3	280	R	0	0	0	0		0	0.00	0.00	
25B4	400	R	0	0	0	0		0	0.00	0.00	
25C	750	SGT	0	55	0	0	05/25/12	15	32.46	0.04	ANDERSON/GRAB
25C	750	SGT	204	110	7	0	06/04/12	10	121.78	0.16	ANDERSON/GRAB
25A1	90	R	0	0	0	0		0	0.00	0.00	
25A2	176	R	0	0	0	0		0	0.00	0.00	
25B1	99	R	0	0	0	0		0	0.00	0.00	
25B2	182	SD-S	240	0	0	0	05/30/12	4	35.71	0.21	LEE
25B3	60	R	0	0	0	0		0	0.00	0.00	
25B4	59	R	0	0	0	0		0	0.00	0.00	
25B5	376	R	0	0	0	0		0	0.00	0.00	
30A(T)	15	R	0	0	0	0		0	0.00	0.00	
30A1	458	R	0	0	0	0		0	0.00	0.00	
30A2	201	SD-S	240	0	10	0	06/20/12	6	61.02	0.30	LEE
30A3	410	R	0	0	0	0		0	0.00	0.00	
30A4	312	SD-S	240	0	10	0	06/24/12	4	40.68	0.13	LEE
30B1(E)	202	R	0	0	0	0		0	0.00	0.00	
30B1(W)	146	SD-S	240	0	10	0	06/09/12	4	40.68	0.25	LEE
30B2	256	SD-S	240	0	0	0	06/04/12	5	48.39	0.19	LEE
30B3	128	R	0	0	0	0		0	0.00	0.00	
30B4	135	SD-S	240	0	10	0	07/01/12	3	30.51	0.23	LEE
30C1	328	SD-S	240	0	10	0	06/14/12	6	61.02	0.19	LEE
30C2	180	R	0	0	0	0		0	0.00	0.00	
30C3	134	R	0	0	0	0		0	0.00	0.00	
30C4	108	R	0	0	0	0		0	0.00	0.00	
30C5	188	SD-S	240	0	10	0	06/25/12	4	40.68	0.22	LEE
30C6	130	R	0	0	0	0		0	0.00	0.00	
31A	171	R	0	0	0	0		0	0.00	0.00	
31A(T)	15	R	0	0	0	0		0	0.00	0.00	
31B(T)	30	R	0	0	0	0		0	0.00	0.00	
31B1	555	R	0	0	0	0		0	0.00	0.00	
31B2	469	R	0	0	0	0		0	0.00	0.00	
31C	506	R	0	0	0	0		0	0.00	0.00	
32A	491	R	0	0	0	0		0	0.00	0.00	
32B1	257	R	0	0	0	0		0	0.00	0.00	
32B2	155	R	0	0	0	0		0	0.00	0.00	
32C1	314	R	0	0	0	0		0	0.00	0.00	
32C2	83	S	0	77	0	0	08/06/12	19	47.97	0.55	ANDERSON/GRAB
33	840	R	0	0	0	0		0	0.00	0.00	
34A1	240	SD-S	204	110	7	0	07/03/12	4	45.71	0.20	ANDERSON/GRAB
34A2	240	SD-S	204	110	7	0	06/29/12	4	45.71	0.20	ANDERSON/GRAB
34A3	222	R	0	0	0	0		0	0.00	0.00	

Page No.  
07/26/11

7

## 2012 Habitat Management by Habitat Unit

habitat unit	acres	treatment	C/L	adult	bull	yearling	outdate	days	acres	acres/acre	permittee
34A4	219	R	0	0	0	0	/	/	0	0.00	0.00
34A5	160	SD-S	204	110	7	0	06/16/12	3	36.53	0.23	ANDERSON/GRABH
34A6	120	SD-S	204	110	7	0	06/13/12	2	24.36	0.20	ANDERSON/GRABH
34B1(E)	174	SD-S	204	110	7	0	06/25/12	3	36.53	0.21	ANDERSON/GRABH
34B1(W)	321	R	0	0	0	0	/	/	0	0.00	0.00
34B2	306	R	0	0	0	0	/	/	0	0.00	0.00
34B3(N)	164	R	0	0	0	0	/	/	0	0.00	0.00
34B3(S)	142	SD-S	204	110	7	0	06/19/12	3	36.53	0.26	ANDERSON/GRABH
34C(T)	15	R	0	0	0	0	/	/	0	0.00	0.00
34C1	202	R	0	0	0	0	/	/	0	0.00	0.00
34C2	227	R	0	0	0	0	/	/	0	0.00	0.00
34C3	155	R	0	0	0	0	/	/	0	0.00	0.00
34C4	155	R	0	0	0	0	/	/	0	0.00	0.00
34C5	155	R	0	0	0	0	/	/	0	0.00	0.00
34D	231	R	0	0	0	0	/	/	0	0.00	0.00
34E1	222	R	0	0	0	0	/	/	0	0.00	0.00
34E2	310	F	179	30	0	0	09/13/12	11	30.23	0.29	ANDERSON/GRABH
34E3	290	F	179	31	0	0	09/02/12	12	36.52	0.34	ANDERSON/GRABH
34F	103	F	179	30	0	0	09/18/12	5	41.01	0.40	ANDERSON/GRABH
35A(N)	224	SD-S	204	110	7	0	06/22/12	3	36.53	0.16	ANDERSON/GRABH
35A(S)	400	R	0	0	0	0	/	/	0	0.00	0.00
35B	322	R	0	0	0	0	/	/	0	0.00	0.00
35BCAME	38	R	0	0	0	0	/	/	0	0.00	0.00
35C	277	R	0	0	0	0	/	/	0	0.00	0.00
36A	229	R	0	0	0	0	/	/	0	0.00	0.00
36B	615	R	0	0	0	0	/	/	0	0.00	0.00
37A	340	SD-S	204	110	7	0	06/11/12	7	55.24	0.25	ANDERSON/GRABH
37B	340	R	0	0	0	0	/	/	0	0.00	0.00
37C	400	R	0	0	0	0	/	/	0	0.00	0.00
GLANA	922	PF922	0	0	0	0	/	/	0	0.00	0.00
HALLBERRY	121	R	0	0	0	0	/	/	0	0.00	0.00
NAP2	455	R	0	0	0	0	/	/	0	0.00	0.00
PELICAN	136	R	0	0	0	0	/	/	0	0.00	0.00
PONY	23	R	0	0	0	0	/	/	0	0.00	0.00
SNOW ROAD	5	H	0	0	0	0	/	/	0	0.00	0.00
SweetR	110	H	0	0	0	0	/	/	0	0.00	0.00

## 9. Fire Management

On March 27 a wildfire was started by lightning and burned 689 acres in habitat units 23B2; 23A1,2,3; 23C; 24A3-4, and 24C1,2,3. High winds made for difficult control. Refuge staff, Valentine, Thedford, Purdum, and Wood Lake responded to the fire. Federal resources were also brought in from Rainwater, LaCreek, Rapid City, and Halsey. The area burned included acreage planned for grazing and part of a planned prescribed burn.

A wildfire burned 1 acre in Habitat Unit 16A3 near the Willow Lake parking lot on March 30. The cause of the fire was not determined but it was suspected to be human caused because of the proximity to the parking lot.

A wildfire burned 109 acres in Habitat Units 35B(N), 35B(S), and 34C2 on August 22. The fire was started by lightning and was one of several fires in the area at the same time. The fire was suppressed by refuge and volunteer firefighters.

A 290 acre prescribed fire was completed on April 4 in Habitat Units 23B1 and 23B2. Conditions for the fire when started were 55 degrees F, 33 percent RH, and 8 mph wind.

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At completion conditions were 56 degrees F, 49 percent RH, and 12 mph winds. The units had first been hayed for many years and then rested. There were a large number of cedar trees in the meadow. Most were killed by the fire. Remaining cedars that were not killed were cut. Much of the cattail and bulrush marsh in the units also burned.

The 5B – Natural Area One prescribed fire was done on May 9. The fire burned 2,500 acres. It was the largest single prescribed fire ever conducted on the refuge. Of note was the almost complete consumption of the tree row, both locust and cedar, on the south shore of Dewey Marsh. We had prepped the tree row with cut and stuff, the placement of cut and dried cedar trees against the live tree row. Also of note was that the fire burned over almost all of Dewey Marsh. This area is very wet and we did not expect it to carry a fire. The fire suppressed the growth of non-native brome grass. Another interesting observation was that the fire skipped over areas of cheatgrass, which was apparently too green and thin to carry a fire. Conditions at the start of the fire were 63 degrees F, 43 percent RH, 9 mph wind. Conditions at the completion of the fire were 75 degrees F, 30 percent RH, and 9 mph wind. Grasses greened up and stayed green until August when they turned brown due to the drought.



Photo F-9a. Results of cut and stuff on a cedar and locust tree belt. MLL.

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Photo F-9b. Brome suppression with a spring burn, burned left, unburned right. MLL

## **10. Pest Management**

Cedar trees continue to increase on the refuge and other prairies in Nebraska. We probably have a head start on the number of cedar trees due to plantings made on the refuge by the Civilian Conservation Corps and others. Cedar control was done using prescribed fire, shearing, and shredding. Prescribed fire information can be found in Section F-9 of this report.

The Bobcat and tree shredder were used to cut cedars in Habitat Units 30C1-6, 30B1(E) and (W), 30B2-4, and 22B1-2. A total of 2,596 acres were treated. Most of the area had scattered trees with a seed source from nearby planted tree groves. The treated areas look very different minus the scattered cedar trees.

Hack and squirt with Rodeo was used to treat 3,974 willow and cottonwood trees in Habitat Unit 15C4, Sawyer Meadow. Seven hundred and six ounces of Rodeo was used. Two people working for 5 days in June was required. Sounds like a lot of trees but unfortunately it is only a small percentage of the trees growing here. Trees will need to be cut mechanically and then sprayed or wicked if we want to keep them in check.

One gallon of Garlon was applied to Russian olive trees using a basal bark treatment. Trees along the Pelican Lake and Little Hay Roads were treated.

Several large groves of locust trees were cut using the forestry grinder attached to the Bobcat. The groves were located in Habitat Units 2B3 (A,B, and C) . These groves have slowly been expanding into adjacent grasslands. They were cut in the winter and spring



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and then the re-sprouts sprayed with Pasture Guard in the fall. Re-sprouts of locusts cut in 2011 were also sprayed. Pasture Guard was also used to spray around the edge of the large grove of locusts in HU 2B3C.

Pesticide use reports and proposals were completed. We used 45 ounces of Milestone at 5 oz per acre for Canada thistle and 2 gallons of Plateau at 8 oz per acre for leafy spurge. All known spurge locations were sprayed. The spurge locations have all been GPSed. Using the application rate to figure acres treated yields 9 acres of thistle and 32 acres of spurge treated. We used 10 gallons of Pasture Guard to spray locust re-sprouts, and 706 ounces of Rodeo to spray invasive phragmites, purple loosestrife, cottonwood and willow re-sprouts. Pesticide use information was entered into the PUPs database. The drought exposed large mud flats and dry cattail beds which may result in increases in Canada thistle next spring.

Common mullen plants were hand pulled in the following locations; 7A1(S) by parking lot 7 plants, 3 in Clear Lake Parking Lot, 15A along road 7 plants, Dewey West Boat Ramp Parking Lot 5 plants, and 2A Watts Lake West Boat Ramp Parking Lot 30 plants, 2B3(c) by Hackberry outlet culvert 13 plants, and 22B4 7 plants. Hand pulling this biennial has worked in reducing plant numbers on the refuge. The seed source is most likely from gravel used on the roads and parking areas. This is not a noxious weed in Nebraska but is in some states.

We received grant money again this year and continued our EDRR project. The project report follows.

### **2012 Report on Early Detection Rapid Response Project F12AC01528 (Old 60181BJ563)**

Mapping and Control of Purple Loosestrife and Invasive Phragmites In and Around Valentine National Wildlife Refuge (NWR), Nebraska

Submitted by Mark Lindvall, Refuge Manager, Valentine NWR and Barb Good-Small, Cherry County Weed Superintendant, Sandhills Weed Management Area Representative

#### Introduction

Purple loosestrife and invasive phragmites have been found in small patches on both Valentine NWR and in the surrounding area. Both are state listed noxious weeds. Large infestations of loosestrife are located about 30 miles north of the refuge along the Niobrara River. Similarly, large infestations of invasive phragmites and purple loosestrife are located along the Platte River about 90 miles south of the refuge. For years the plants were found only along the rivers. It appears that they are now moving out into Sandhills wetlands including those on the refuge. The goal of this early detection and rapid response project is to locate and spray with herbicides small patches of both invasive phragmites and purple loosestrife both on and adjacent to Valentine NWR and hopefully prevent costly future control expense by treating the plants before

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they spread. This report covers work conducted in 2012. Work conducted under this grant in 2011 is contained in a separate report.

### Methods

The Sandhills Weed Management Area contracted with a weed sprayer to survey areas adjacent to Valentine NWR, Cherry County. Search effort was concentrated in areas where infestations have been noted in past years. The contractor was trained in identifying invasive phragmites and purple loosestrife. She was supplied with leaflets describing the plants. She contacted ranchers in the search areas for permission to search and spray. She provided leaflets to ranchers that had photos of both plants. She kept a daily log and marked areas searched on a map. Surveying for purple loosestrife was conducted from August 27 -31, 2012 when the plant was in bloom and easily spotted and identified. She logged 29.5 hours and used an all terrain vehicle for transportation. Surveying for invasive phragmites was conducted from October 1 -9, 2012. At this time the invasive was in bloom and more easily identified. She logged 32.5 hours and used an all terrain vehicle for transportation. She kept a daily log and marked areas searched on a map.

Weed superintendents within the Sandhills Weed Management Area were provided funds to conduct searches and sprayed infestations. Brown, Loup, and Garfield Counties participated. They kept logs of areas searched and sprayed for both purple loosestrife and invasive phragmites. Searches and spraying for both plants were often conducted at the same time and recorded in the daily log. Brown County logged 35.5 hours, Loup County 12 hours, and Garfield County 21.5 hours. They also made contact with landowners and inquired about infestations on their properties.

Valentine NWR refuge staff conducted surveys for purple loosestrife on Valentine NWR from July 24 – August 30, 2012. Surveys were conducted by airboat, all terrain vehicle, and pickup. Airboat surveys were conducted by driving the boat along the entire shoreline of a lake. Surveys by pickup were used to search wetlands adjacent to public use roads and boat ramps. All terrain vehicles were used to search wetland areas and in some cases driven along lake shorelines. Areas searched and the search date were marked on a map. No log of vehicle miles or search hours was kept but all or parts of 10 days were spent searching. Searches were conducted on all refuge lakes that were not searched in 2011 thus giving us complete coverage over the 2 year period. Areas where purple loosestrife had been noted in the past were more intensively searched.

Surveys for invasive phragmites were conducted from August 14 – September 28, 2012 using the same methods as for loosestrife. All or parts of 7 days were spent searching for invasive phragmites. Searches were conducted on all refuge lakes that were not searched in 2011 thus giving us complete coverage over the 2 year period. Areas where invasive phragmites was noted in the past were more intensively searched.

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## Results

### Purple Loosestrife

No purple loosestrife was found in the off refuge search conducted in areas adjacent to the refuge. In 2011 one purple loosestrife plant was found in the Highway 83 right of way near where Goose Creek crosses the highway (Cherry County T28N R28W sections 13 and 14). The plant was sprayed with glyphosate herbicide. This location is 1 mile south of the refuge boundary. In 2012 searches were conducted along Goose Creek both east and west of Highway 83 and no loosestrife located. In the past purple loosestrife has been found in two other areas north of the refuge along Highway 83. Both of these areas and surrounding suitable habitat were intensively searched (Cherry County T32N R28W, sections 13, 24, 25 36; T32N R27W, sections 18, 19, 30 and 31). No purple loosestrife was located.

In the on refuge search, one small infestation of purple loosestrife was found in the Pony Lake Road ditch on Valentine NWR in Habitat Unit 22B5 (N42 29'15.5" W100 31'55.8"). It was sprayed with Rodeo herbicide and marked with an orange painted lathe. The three locations where we have seen purple loosestrife on the refuge in the past were checked and no plants found. No loosestrife was found in our other search efforts.



Photo 1. Purple loosestrife, Pony Lake Road, Valentine NWR 2012 Mark Lindvall, USFWS

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Grant funds were provided to weed managers within the Sandhills Weed Management Area to search for and spray purple loosestrife. Brown County managers sprayed 6 infestations of purple loosestrife within the county. It is not known if these were new locations or locations known to the managers (Brown County T30N R23W section 17, 2 locations; T30N R22W sections 12, 14, 23, 1 unknown). They also searched several areas, including Yellowthroat Wildlife Management Area and found no purple loosestrife.

Loup County Managers searched areas on the Calamus Reservoir to check areas sprayed in the past and to look for new infestations. They reported purple loosestrife found on Calamus Reservoir to the Nebraska Game and Parks Commission.

Garfield County managers conducted rather extensive searches for purple loosestrife and found and sprayed the first record for this plant in the county (N41.97480 W099.03959) which was near a roadway. They noted that it would have not been found without our grant funds.

Purple loosestrife in the Valentine Mill Pond was sprayed in 2010 using an Argo, and the refuge airboat in 2011 and 2012. Glyphosate herbicide was used. This infestation is just outside of the Sandhills. The number of plants is decreasing each year.

Areas searched for purple loosestrife and known locations of purple loosestrife in the vicinity of Valentine NWR are shown on map 1. All purple loosestrife plants located to date have been sprayed with herbicide.

#### Invasive Phragmites

No new locations for invasive phragmites were located in off refuge searches in areas near and adjacent to Valentine NWR. This year searches were concentrated in areas near where invasive phragmites has been located in the past (East Long Lake, Marsh Lakes, and Goose Creek). The contractor searched private lands adjacent to the Marsh Lakes which are on the refuge (T30N R27W sections 13 through 36 and T29N R27W sections 2 through 24 private land portions); private lands adjacent to East Long Lake which is on the refuge (T28N R26W sections 3,4,8,9,10 private lands portions); and private lands east and west of Highway 83 along Goose Creek T28N R28W sections 8,9,10,11,14,15,16,21,22; T29N R27W sections 13,14; T28N R27W 19,20,29, 30, 32,33; and T27N R27W sections 3,4,5,8,9,10). The searches were conducted in October during a severe drought. If invasive phragmites was present it may have not been detected due to intensive cattle grazing in dry wetlands. Some dry wetlands were also hayed prior to the search time.

On refuge searches for invasive phragmites were conducted on Marsh Lakes and Whitewater Lake using an airboat. No invasive phragmites was found. We found and sprayed 19 patches of the invasive variety on the Marsh Lakes in 2009, treated them again in 2010, and have found none in 2011 and 2012 searches. Control appears to have been effective as this is the second year that we have not found any. We also used an ATV to drive the shorelines of Roger's Potholes, Devil's Punch Bowl, Dads, Mule,

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Coleman, Baker, Lost, West Twin, East Twin, Crooked, and East Long lakes. No new patches of invasive phragmites were found. All refuge lakes have now been searched, some in 2011 and the rest this year. The patch that we partially sprayed last year at East Long Lake was mostly consumed by cattle during an August graze. Low water levels allowed the cattle to access the area. Due to a severe drought, wetland plants were about the only green forage left and were sought out by the cattle. The few standing plants left were sprayed with Rodeo. The area will need to be checked again and sprayed next year. This is now the only known location for invasive phragmites on the refuge.

We sprayed invasive phragmites south of the refuge along Highway 83 near Goose Creek using Rodeo and the Argo. We cleaned up a patch in the mitigation wetland south of Goose Creek and on the east side of the road. This patch was sprayed last year and most of the plants were dead. We also sprayed some small patches along the roadway on the east side. We also noted a new patch just across the highway on the west side and sprayed this also. We sprayed 6 patches along the west side of the Highway south of Goose Creek. All patches were in the Highway right of way. Nebraska Department of Roads has sprayed here in the past. Several years of spraying has reduced invasive phragmites in this location but not eliminated it. Of note is that we found invasive phragmites growing alongside switch grass, which is surely not a wetland plant.

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Photo 2. Invasive phragmites growing among switchgrass. Mark Lindvall USFWS





Photo 3. Invasive phragmites September 2012, mitigation wetland Highway 83 sprayed in 2011. Melvin Nenneman USFWS.

We collected samples of phragmites, both invasive and native, that will be examined for invasive or native DNA by a genetics class at the University of Nebraska Kearney. A total of 30 samples were collected and sent in from locations on or near the refuge. Results from the analysis were not received at the time of writing of this report.

Map 2. Areas searched (green lines and blocks) and known locations of invasive phragmites (dots) in the vicinity of and on Valentine NWR.

Searches by weed managers in Brown, Loup, and Garfield Counties located one patch of invasive phragmites in Brown County (T25N R22W section 1) and one patch in Garfield County (N41.76303 W099.08012). Both were sprayed with herbicide. Loup County weed managers sprayed a previously known location of invasive phragmites in a road right of way.

The invasive phragmites patch in the Valentine City Mill Pond sprayed in 2011 was checked and no plants seen. This is outside of the Sandhills search area.

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An article *Funds Available from Sandhills WMA to Spray Purple Loosestrife and Invasive Phragmites* written by Mark Lindvall and Barbara Good-Small appeared in the Spring 2012 Weed Watch Publication. The article describes the threat from these invasives and assistance available through the grant.

### Discussion

Purple loosestrife was found in one new location on Valentine NWR as a result of the 2012 survey. This location was in a road ditch. The first location in Garfield County is also along a roadway. The 2011 and 2012 locations indicate that purple loosestrife may be invading Sandhills wetlands from road ditches and in one case a boat ramp. Gravel mined along rivers with purple loosestrife, transported here and then spread on roads is a very likely source of new infestations. Our searches indicated that purple loosestrife is present but rare in and around Valentine NWR. Treatment of small patches of a few plants with glyphosate appears to eliminate the plant in one year. Larger infestations will likely take several years of treatment which may or may not eliminate the infestation.

All four county weed managers that participated in searches have located purple loosestrife and three located invasive phragmites. This indicates that purple loosestrife and invasive phragmites are likely present at least in small amounts throughout the Sandhills. There are 15 counties in the Sandhills Weed Management Area. It would be desirable to involve all the counties in searching for and treating infestations.

Due to the severe drought, 2012 was not a good year for locating invasive phragmites. In late summer and fall cattle concentrated feeding in wetlands and likely ate and trampled wetland plants decreasing the likelihood of detection.

The first record of invasive phragmites for Cherry County was along Highway 83 in 2009. In the same year we located 13 small patches of invasive phragmites on one lake on the Refuge. These phragmites sites were the only records for the county. In 2011 we found two additional locations, one on and one nearby the refuge. All the patches of phragmites located to date have been relatively small and we have had success in controlling them with herbicide. Our searches indicated that invasive phragmites is present but rare in and around Valentine NWR.

The threat to Sandhills wetlands from both invasive phragmites and purple loosestrife is imminent. Valentine NWR has 11,000 acres of wetlands which would be affected by these invasive plants. The 19,000 square mile Sandhills region has many thousands of acres of wetlands that could potentially be affected. Native vegetation would be replaced and wildlife habitat degraded. A larger early detection and response project to search for and treat invasive phragmites and purple loosestrife in the Sandhills region would be beneficial.



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### Funds

Grant funds carried over from 2011	\$3,596.47
Grant funds received 2012	\$10,000.00
122.5 hours of searches	- \$3,501.25
1,072 vehicle miles	- \$589.60
22.5 hours herbicide application	- \$1,247.50
Herbicide and surfactant	- \$ 573.79
Remaining funds	\$7,684.33

### Plans for 2013

The Cherry County Weed Superintendant will do follow-up visits to off refuge sites near to the refuge where purple loosestrife or invasive phragmites have been located in the past. Visits will evaluate the effectiveness of treatments and treat any remaining plants if present. Searches conducted for invasive phragmites and purple loosestrife on private lands adjacent to the refuge in 2012 will be repeated. Refuge staff will do follow-up visits of on refuge sites where purple loosestrife or invasive phragmites has been located in the past. We will evaluate effectiveness of treatments and treat any remaining plants. The invasive phragmites at East Long Lake on the refuge will be sprayed with Rodeo in the fall.

The remaining funds will be used by the Sandhills Weed Management Area to search for and spray invasive phragmites and purple loosestrife in any Sandhills location within their weed management area. Counties that did not participate in 2012 will be encouraged to do so in 2013.

An article on this project will be written for "The Weed Watch," a joint publication of 4 weed management areas.

We will apply for additional grant funds of \$10,000 if EDRR funding is available.

### Appendix 1. Known Locations of Invasive Phragmites on or near to Valentine NWR, Cherry County, NE

Marsh Lakes, Valentine NWR, no invasive phragmites found in 2011 or 2012 searches

42.52237N 100.49939W sprayed in 2009

42.52.72N 100.49511W sprayed in 2009

42.52155N 100.49118W sprayed in 2009

42.51745N 100.48833W sprayed in 2009

42.51742N 100.48798W sprayed in 2009

42.51196N 100.49200W sprayed in 2009

42.51191W 100.48875W sprayed in 2009

[Type text]

42.50088N 100.49660W sprayed in 2009  
42.50417N 100.49574W sprayed in 2009  
42.51008N 100.49875W sprayed in 2009  
42.51012N 100.49957W sprayed in 2009  
42.51052N 100.50009W sprayed in 2009  
42.52338N 100.51429W sprayed in 2009  
42.52400N 100.51260W sprayed in 2009  
42.54240N 100.50937W sprayed in 2009  
42.54188N 100.51987W sprayed in 2009  
42.54184N 100.51933W sprayed in 2009  
2 locations not GPS'ed sprayed in 2009  
42.53125627N 100.51549399W sprayed in 2010  
42.54172032N 100.51820336W sprayed in 2010  
42.54181302N 100.51868708W sprayed in 2010  
42.54200949N 100.51943533W sprayed in 2010  
42.54200698N 100.51943324W sprayed in 2010  
42.54199524N 100.51787077W sprayed in 2010  
42.54259556N 100.51265303W sprayed in 2010  
42.54251610N 100.51162608W sprayed in 2010  
42.54245566N 100.51107933W sprayed in 2010  
42.54080946N 100.50374935W sprayed in 2010  
42.49321617N 100.49082270W sprayed in 2010  
42.50440283N 100.49571781W sprayed in 2010  
42.50607753N 100.49568957W sprayed in 2010  
42.50848448N 100.49708071W sprayed in 2010  
42.51080803N 100.49590456W sprayed in 2010  
42.51517843N 100.51222069W sprayed in 2010  
42.52369378N 100.51377654W sprayed in 2010  
42.52623039N 100.50873960W sprayed in 2010  
42.52354332N 100.50277429W sprayed in 2010  
42.53032655N 100.51411140W sprayed in 2010  
42.53091814N 100.51501237W sprayed in 2010

East Long Lake, Valentine NWR

42 25' 40.517N 100 24' 26.936W sprayed in 2011, heavily grazed in 2012, few remaining plants standing sprayed in 2012

Mitigation Wetland Highway 83, Mile Marker 178, East Side of Highway

42°22'57.79"N, 100°32'32.71"W sprayed in 2011, follow up spraying of patch in 2012

West side of Highway 83, Mile Marker 178, directly across the highway from the above record, sprayed by refuge staff in 2012

West Road Ditch south of where Goose Creek crosses Highway 83

Not GPS'ed, sprayed by Nebraska Dept. of Roads in past, sprayed by refuge staff in 2012

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## Appendix 2. Known Locations of Purple Loosestrife on or near to Valentine NWR, Cherry County, NE

East Hackberry Boat Ramp, HU 3C1, Valentine NWR

42 deg 33' 34.6N 100 deg 39 05.5W sprayed in 2010, no plants in 2011 or 2012

Highway 83 right of way Habitat Unit 21B1, Valentine NWR

42 30' 07.6N; 100 32, 14.1W sprayed in 2011, no plants in 2012

Pony Lake Road, in ditch, Habitat Unit 22B5 N42 29'15.5" W100 31'55.8", Valentine NWR sprayed in 2012

West side of Highway 83 near mile marker 201 (T32N R28W Section 24)

not GPS'ed hand pulled in 2009 sprayed in 2010, no plants in 2011 or 2012

West side of US Highway 83 near mile marker 199 (T32NR28W Section 36).

Not GPS'ed sprayed in 2010, no plants in 2011 or 2012

Goose Creek Crossing with Highway 83

not GPS'ed sprayed in 2011, no plants in 2012

### **11. Water Rights**

### **12. Wilderness and Special Areas**

This year Nebraska's Center for Great Plains Studies has named Niobrara National Scenic River, Fort Niobrara and Valentine National Wildlife Refuges, and the Nature Conservancy's Niobrara Valley Preserve to their list of the Great Plains Top 50 Ecotourism Sites. An ecotourism site is defined as a place primarily devoted to environmental or biodiversity conservation and providing an opportunity for the public to experience nature.

The list results from a survey conducted by the University of Nebraska Center for Great Plains Studies. It asked 51 professional naturalists which Great Plains sites considered to offer the best, most powerful environmental experience or are ones that are ecologically the most important. Also considered was if survey respondents would definitely recommend their best friends to visit.

The Center recognizes the importance of ecotourism in helping nearby communities to thrive economically, increasing public awareness of nature, and generating funding for conservation. More information is available at [www.unl.edu/plains](http://www.unl.edu/plains).

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Photo F-12. Whited, Hicks, and Lindvall with Ecotourism Site certificates. JG

The refuge became a Registered Natural Landmark in 1979. National Landmarks were designated by the old Heritage Conservation Recreation Service. The program is now administered by the National Park Service ([www.nature.nps.gov/nnl](http://www.nature.nps.gov/nnl)).

Valentine National Wildlife was designated as a landmark in 1979.

In 2005, Valentine National Wildlife Refuge was designated a Nebraska Important Bird Area by the Audubon Society. The IBA program is an inventory of the key sites within a state that support significant numbers and high diversity of birds. The IBA program is a conservation and education effort of the National Audubon Society and has no regulatory authority. Our application was reviewed by a technical committee which commented on the high diversity of species and the large population of greater prairie chickens found on Valentine National Wildlife Refuge.

The refuge is also recognized as an Important Bird Area by the American Bird Conservancy ([www.abcbirds.org](http://www.abcbirds.org)).

The south west part of the refuge is also a proposed wilderness area. The area designated is about 15,937 acres in size. Wilderness Fellow Mark Swenson prepared draft wilderness character measures for the area but did not have time to write a complete plan.

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### **13. Easement Monitoring**

Four FmHA easements (Mead – 2 parts, Wagner, Yellowthroat (aka Tower), one development easement (Colburn) are managed out of Valentine National Wildlife Refuge. We also have a road easement to access the Yellowthroat Wildlife Management Area (fee title parcel).

#### Mead FmHa Easement 221 acres (Keya Paha County)

The Mead Easement was visited on August 29. The landowner contacted us and informed us that parts of the west and north fences burned in the wildfires that swept through the area. The fence here is off line and we have offered to assist in replacing it in the past by providing materials if the landowners would provide assistance. They have refused saying it is totally our responsibility. The easement was visited on September 29. Portions of the east boundary fence were burned as well as a small part of the easement ground. The landowner agreed to assist with building new fence if we supply materials, clear the line, and provide some help. The neighbor across the fence will offer no help. We will try to do the work next summer.

A contractor was used to clear cedar trees using \$18,000 of equipment rental funds. Cedar trees along the east and north boundary were cleared so the fence can be put on line. This clearing may also serve as a good fire break for future prescribed fire. Trees in the meadow on the west part of the easement were also cleared.

There is a three year grazing plan for this easement. The part of the easement grazed this year has little cover due to the drought. The part not grazed had good cover.

#### Wagner FmHa Easement 349 acres (Knox County)

On one portion of the easement (north of the county road) we have a management plan using grazing, fire, and tree clearing to bring back the prairie here. The Natural Resource Conservation Service is cost share funding with the landowner to do the work. Only parts of the plan have been completed. A prescribed fire was conducted on the area in May. A new management plan needs to be made for this area.

The portion of the easement south of the county road has a less restrictive easement that allows grazing and haying at the landowner's discretion.

The Wagner Easement was visited on March 1. No violations were noted.

#### Yellowthroat FmHA easement also known as Tower Easement 440 acres (Brown County)

This easement is adjacent to the Yellowthroat Wildlife Management Area (see section J.3.). We have a grazing plan in place for this easement. The area was checked in the fall and most of the pastures had fair cover considering the drought.

### Yellowthroat Access Road Easement 17 acres (Brown County)

We also have an access easement from the highway into the Yellowthroat WMA. This easement was purchased so the public could access the WMA. Land adjacent to the WMA was sold for recreational use and we informed the landowner several times that he could not use our road and easement to access his property. He continued to use the road again this year. He has a separate access easement that is separate from our easement but there is no road on it.

### Colburn Burying Beetle Easement

The Fish and Wildlife Service also has an easement on 1,324.25 acres of land that was formerly part of Valentine NWR. This land was traded away for other lands in what we refer to as the Colburn exchange. The easement was habitat units 24B1, 24B2, 12B3, 24D (N), 24D(S), 12B4, and 12B5 which were traded for habitat units 37A, 37B, and 37C which are now part of the refuge. The easement was placed on the land to protect the endangered American burying beetle. The easement restricts development on the site. We go by this land as we do refuge work and noted no developments.

## **G. WILDLIFE**

### **1. Wildlife Diversity**

Wildlife diversity, with the exception of large ungulates and their predators, is relatively unchanged in the Nebraska Sandhills as compared to most areas of the United States. Native grasslands dominate the local flora, and indigenous wildlife is well represented. Threats to this largely intact grassland system are changes in the disturbances that led to the evolution of the grassland system and invading exotic species. While much is not known about historic disturbance, fires and large bison herds undoubtedly played a role in shaping this grassland system. A bison vertebra, with the long spine that extends into the buffalo hump, was found along the dry shoreline of the Marsh Lakes at Valentine NWR in 2002, and a partial buffalo skull was found during the renovation of Hackberry Lake in 2004.

Maintenance and enhancement of the Sandhills prairie is necessary to ensure the ecological integrity of the flora and fauna found on Valentine NWR. Grassland management on the refuge incorporates grazing, mowing, rest and prescribed burning to accomplish refuge objectives. Nesting information collected at the refuge indicates that management for greater quantities of tall, vigorous native vegetation provides the best nesting cover for migratory waterfowl and resident

prairie grouse. This type of cover is often lacking on private land, thus the refuge has sought to use grassland disturbance to maintain grassland vigor without compromising nesting cover.

Refuge wetland management is primarily accomplished to maintain wetland quality. Several measures have been implemented to reduce common carp populations on the refuge, including size limits on northern pike (keeping larger pike in the lake to act as predators on young carp), capture of adults, and chemical renovation of lakes. Carp have detrimental effects on water quality, and subsequent plant and invertebrate production which play an important role in waterfowl production. Removal of carp has not been accomplished on refuge lakes, although renovations in the 1970's and 1980's removed carp for a few years. Current management using northern pike appears to be having some impact on carp populations, although in some years a large class of carp recruits into the population.

## 2. Endangered and/or Threatened Species

### a. Bald Eagle

Three bald eagle nests located on or near Valentine NWR were observed in 2012. Eagles have nested in a cottonwood on the west side of Vrinder's swamp just south of Valentine NWR for at least 4 years. The nest is in a cottonwood tree near the south end of a cottonwood row. The nest is on land owned by Blaine Sherman, and was observed 3 times from several vantage points from the county road. The nest is difficult to see, especially after the trees leaf out. This nest produced 3 young in 2009, was not active in 2010, and produced at least one fledgling in 2011 and in 2012. A second off-refuge nest is located west of the refuge and can be easily observed from State Hwy 97 near where Gordon Creek crosses the highway. A new nest was built in a dead cottonwood tree, about 200 meters north of where the previous nest blew down. No young were observed in either visit to the nest, but two adults were seen on each visit. A pair of adult bald eagles returned to the nest in the 34C trees that was used in previous years. After a couple of years of apparently unsuccessful nest attempts, the pair was observed to have one large nestling in the nest on each of two visits in early June. A visit in late Jun revealed 2 fledged juvenile bald eagles sitting on a burn pile near the nest tree. It was pretty exciting to see this pair successfully raise young after several years with no young produced.

### b. Peregrine Falcon

Migrating peregrine falcons are usually observed traveling through Valentine NWR in the spring (generally April) and in the fall (generally Sept-Nov). None were observed in 2012.

### c. Whooping Crane

No observations of Whooping Cranes on Valentine NWR in 2012. These cranes are sporadic refuge visitors and likely often not spotted as the refuge is large and

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there are not a lot of birdwatchers around to locate cranes when they do land on the refuge. Occasional observations are made of Whooping cranes stopping in refuge wetlands and meadows during migration.

d. Western Prairie Fringed Orchid

Western prairie fringed orchid (*Platanthera praeclara*) survey on Valentine National Wildlife Refuge

INTRODUCTION - The western prairie fringed orchid (*Platanthera praeclara*) was federally listed as a threatened species on September, 28 1989. It has experienced rangewide population decline of about 60% from historic levels. This decline can most likely be attributed to the conversion of native grasslands to cropland. The fertile wet meadows where orchids grow also have soil that is ideal for agricultural crop production. Currently, there are 175 known sites of western prairie fringed orchids in North America. These locations occur in six states and Canada.

Western prairie fringed orchids have been counted on Valentine National Wildlife Refuge since 1981, when the first orchid was documented in the habitat unit 32B2 in the Pony Lake Valley. For a few years after, sites were documented where orchids were found but numbers of plants were not counted. Since 1989-1990, counts have been conducted almost annually on 4 meadows where the orchid is known to occur, and additional sites have been searched as orchids have been found. In 1998, orchid plants and blossoms were inventoried in Sweetwater Valley in cooperation with Marge From, UN-L/Henry Doorly Zoo, to determine pollination rates and development of seed capsules.

STUDY AREA AND METHODS - Valentine NWR is located in the Sandhills of Nebraska. This area is mainly native grasslands with rolling sand dunes and interdunal valleys. The refuge is also has many scattered lakes and wet meadows. The majority of the surrounding landscape is in private ownership, which is mainly used for cattle ranching, with most meadows hayed in mid-summer.

All habitat units where western prairie fringed orchids have been located on Valentine NWR were surveyed by one to two refuge staff members from 26 Jun-05 July 2012. The orchids bloomed approximately 1 week earlier in 2012 than they do on average. A few



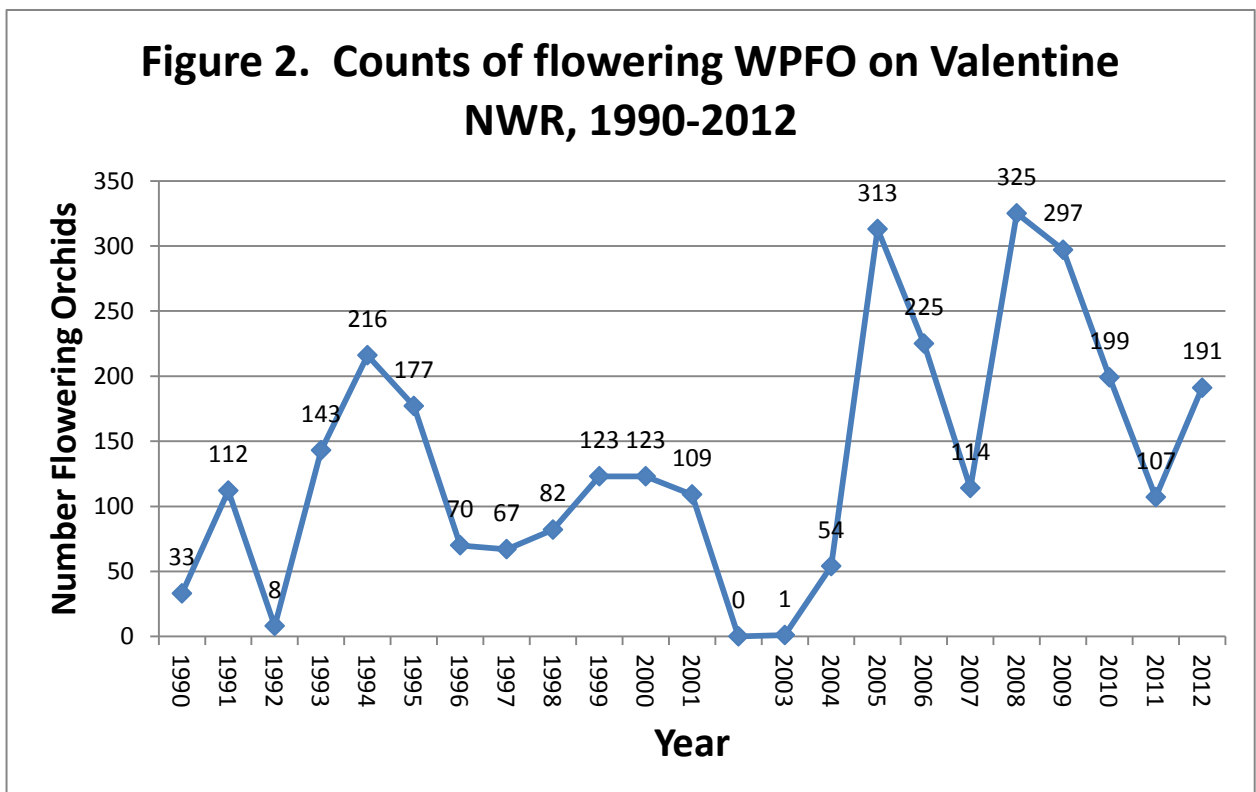
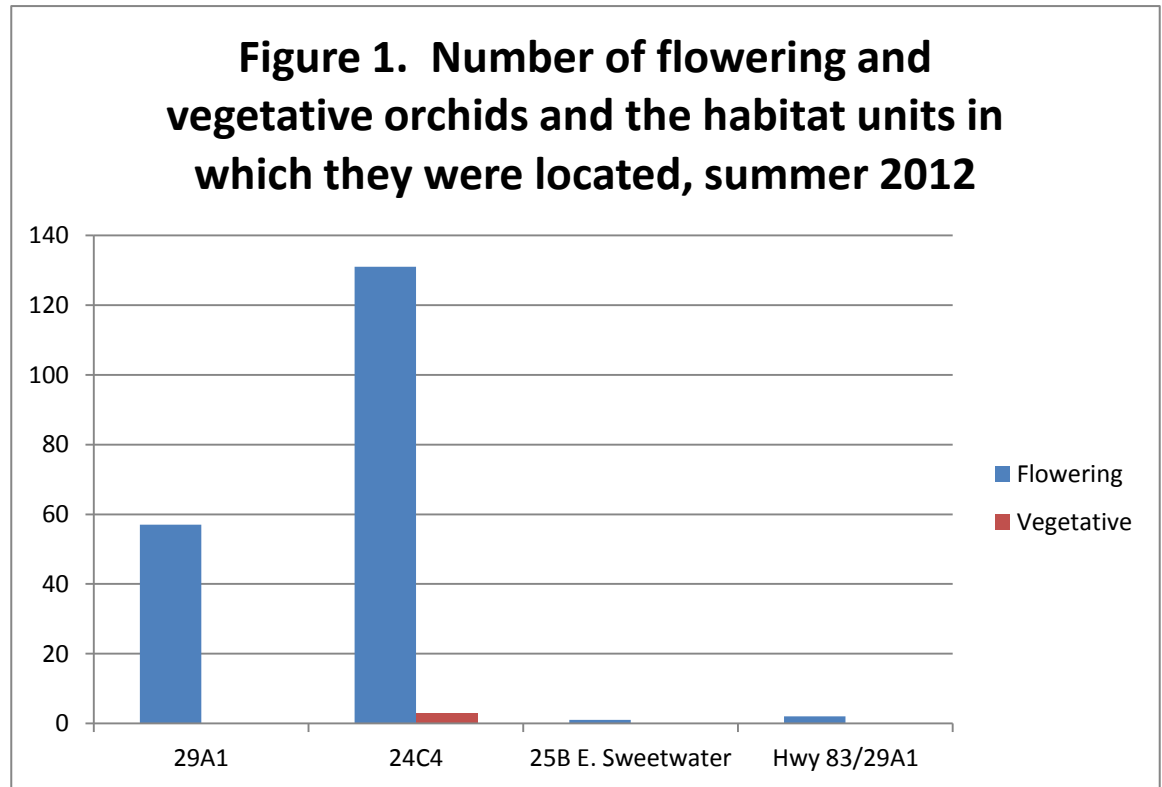
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areas containing potentially suitable habitat have not been searched, and were not checked this year. Plants were found by systematically searching these meadows. Searchers spread out approximately 20 meters apart and walked back and forth until the entire habitat unit was searched. Four sites were searched using an ORUV with a driver and passenger both looking for orchids as transects were driven back and forth across the habitat unit. Tall vegetation in several units makes locating orchids difficult, and there is a possibility that some flowering orchids may have been overlooked. The flowers mostly occurred in wet meadows, and in some years flowers have been found growing in up to 10 cm of water. Several orchid locations are known on private lands, and these are scanned from the public roadways.

Surveys provide a count of flowering and vegetative western prairie fringed orchids on the refuge. Most vegetative orchids are located near a staked plant from the previous year, as they are difficult to spot growing among other green vegetation. The height of each orchid was measured and the total number of flowers and buds were counted on each flowering plant. GPS coordinates were also taken at all orchid locations. In meadows that are hayed, a brightly painted wooden lath was placed next to the plant so the permittee could hay around the orchids. This prevents the orchids from being cut during haying operations, and allows the orchids to produce seed.

RESULTS - Orchid surveys took about 6 days, accomplished primarily by two observers. Eighteen habitat units and other locations (e.g. south of Sweetwater information kiosk) were searched for orchids on the refuge, and an additional six sites were checked off refuge. A total of 194 orchids were located on Valentine NWR, including 191 flowering plants and 3 vegetative plants (Figure 1). Only 4 units had orchids located. No flowering orchids were spotted on private lands near the refuge in 2012. The number of flowering orchids found on Valentine NWR in 2012 rebounded from a dip in 2011 to nearly the same level as the 2010 survey (Figure 2). Only 4 of 17 previously occupied refuge locations had flowering orchids in 2012, and most of these were found in 24C4 and 29A (Table G2d1). The other two locations only had three flowering orchids between them.

DISCUSSION - Orchid numbers on Valentine NWR have been highly variable since records began being kept in 1990. The Sweetwater Valley on the refuge continues to be where the orchids seem to be most persistent and most abundant. Currently, little seems to be known about what factors drive orchid germination and development from year to year. There does not seem to be a pattern in the Valentine NWR data, as numbers are variable from year to year within units and across the refuge. HU 24C4 has likely been a hay meadow from when (or before) the refuge was established, and often is grazed in the spring. Across the highway, HU 29A has not been hayed for a number of years, and was most recently treated with a spring grazing treatment in 2010. Variability in orchid emergence and lack of clarity about the life history of the orchid make determination of management impacts difficult to assess. On Valentine NWR, management of units where orchids occur has ranged from annual haying to periodic grazing to rest, and the number of orchids seems to vary independently from the management actions. All known orchid locations have had at least one year when our orchid searches found no orchids. Drought conditions in 2002 and 2003 seemed to drive the low number of orchids for these two years. As moisture returned in 2005, the number of orchids located increased dramatically, producing one of the largest orchid counts for the refuge. Since 2005, annual precipitation has been near or above average, and orchid numbers do not seem to be closely tracking annual precipitation. It will be interesting to see how the drought conditions in the summer and fall of 2012 impact the orchids in 2013. There is some thought that moisture going into the dormant season is important to the growth and development of orchids.



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Table G2d1. Location, number of orchids found in the last 5 years at each site.					
Habitat Unit	2008	2009	2010	2011	2012
32B2	64	1	10	1	0
29A1	9	42	12	45	57
24A2	2	12	0	0	0
24C2	3	1	0	0	0
24C4	133	220	176	69	134
25B Sweetwater	2	2	3	4	1
25B Cow Lake	0	0	0	0	0
Hackberry HQ ROW	0	0	0	0	0
Hwy 83 ROW/29A1	6	7	4	2	2
18B7	15	0	2	1	0
36A	0	0	0	0	0
21A3	16	0	1	0	0
21A4	3	0	1	0	0
16E4	75	3	14	0	0
7A2	0	0	0	0	0
15C3	1	0	0	0	0
13A	12	13	3	0	0
27A2	NA	NA	1	17	0

e. Blowout Penstemon

Survey of blowout penstemon (*Penstemon haydenii*) on Valentine National Wildlife Refuge

INTRODUCTION - Blowout penstemon (*Penstemon haydenii*) was listed as an endangered species on September 1, 1987. At the time of listing, the plant was known only in the Nebraska Sandhills, although a population has since been located in southeastern Wyoming. The common name of the plant refers to the round or conical shaped, wind-derived depressions in sand dunes that are largely devoid of vegetation. These open, sandy environments are the habitat occupied by blowout penstemon and other pioneer plant species. Along with blowout grass, blowout penstemon is one of the first plants to grow and start stabilizing these blowouts. The waxy leaves of blowout penstemon, and its propensity to root at nodes covered by blowing sand allows the plant to survive in the harsh conditions in the blowouts. Once the blowout begins to stabilize

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and other plants begin to colonize, blowout penstemon tends to decline as it cannot compete with other plants. Research also suggests that the plant needs the sandblasting effects of wind and sand to thrive. Due to changes in management of the Sandhills, the amount of available habitat has decreased through the 20<sup>th</sup> century.

As part of the recovery plan, blowout penstemon seedlings have been transplanted into blowouts across the Sandhills. Transplants of blowout penstemon on Valentine NWR were started in 1996, with 2000 seedling plants transplanted into three blowouts. Seedlings were grown by Dr. James Stubbendieck at the University of Nebraska-Lincoln. Seedlings have been transplanted on the refuge from 1996-2001, and from 2004-2008, with a total of 16,969 seedlings placed on the refuge. Seedlings have been transplanted by Stubbendieck and his students, refuge staff, and volunteers. A total of 70 blowouts across the refuge have had penstemon transplanted since 1996. Transplant blowouts have been monitored annually since 1999, with the number of vegetative plants, flowering plants, and flowering stalks recorded for each blowout.

STUDY AREA AND METHODS - The 71,772 acre Valentine National Wildlife Refuge lies in the Sandhills of Nebraska. Habitat on the refuge is similar to much of the Sandhills, with rolling, grass covered sand dunes interspersed with lakes, wetlands, and meadows in the valleys. A number of blowouts exist across the refuge, although many are either small and/or healing. The majority of the surrounding landscape is in private ownership which is mainly used for ranching, so the native grasslands are mostly intact. All known blowout penstemon locations across the refuge are surveyed during the penstemon flowering period, which is typically around the first two weeks of June. There are currently 70 blowouts on the refuge that have had penstemon seedlings transplanted. In addition, there are seven locations on the refuge that had native penstemon at one time. Three of these locations did not have a native plant located for many years (HU 3D, HU 16C, and HU 19A), and has since had seedling transplanted into the blowout. Two of the native blowout locations are poorly documented, and these blowouts are not included in the yearly survey (HU 8B and HU 10B(W)). Each blowout that has had penstemon (either transplants or native plants) was systematically searched and flowering and

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vegetative plants were recorded. During the counts, a tally is kept for the number of vegetative plants, flowering plants, and total flowering stalks. Counted plants are marked with a scrape in the sand. If more than one person is counting plants in a blowout, each person keeps a tally, and the total number of plants is recorded for the blowout.

RESULTS AND DISCUSSION - By mid-May 2012, blowout penstemon had already begun blooming, a full 2 weeks earlier than average. This is likely due to an exceptionally warm month of March, which probably caused the plants to break dormancy early. All 70 of the transplant blowout locations were searched for the presence of blowout penstemon in 2012., and 2 blowouts with naturally occurring penstemon were surveyed. It took about 11 person days of work to complete the penstemon surveys (approximately 4 days biologist and biological technician, about 3 days biological technician).

A total of 901 blowout penstemon plants were documented in the 48 transplant blowouts (Fig. 1). No blowout penstemon plants were located in 22 blowouts that have had seedlings planted in them. An additional 26 plants were located in two units with native plants. Blowout penstemon numbers have been tracked on the refuge since 1999 (Fig. 2), and the number of plants located has varied considerably. In 2012, the total number of plants decreased by 454 plants from the previous year. A similar drop in numbers occurred from 2007 to 2008. The number of vegetative plants observed was almost three times the number of flowering plants, and there were only 2.2 flowering stems/flowering plant. Across all years of monitoring on the refuge, flowering penstemon plants have averaged 3.7 flowering stalks per plant, so the flowering effort in 2012 was somewhat reduced.

While transplanting efforts have increased the number of blowout penstemon plants on Valentine NWR, it appears as though continued transplanting efforts may be necessary to sustain these numbers in the long term. In an attempt to look at the long-term survivorship of transplants, survey data were plotted for only those transplants done prior to 2005 (Figure 3). This data suggests that there has been a steady decline in the number of plants observed over this 14 year time period. One potential issue is that many of the blowouts that currently have plants have only a small number of penstemon, and the

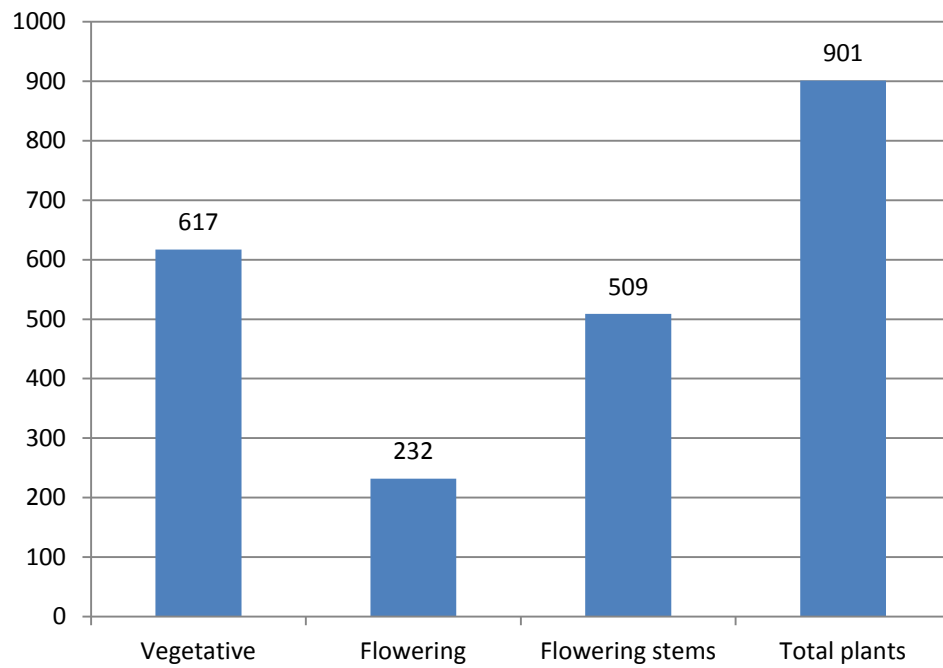
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blowouts themselves are small. Of the 48 blowouts that had blowout penstemon plants in 2012, only 7 had at least 50 plants. The Valentine NWR CCP has an objective of maintaining a minimum of 5 blowouts with a population of at least 100 plants. In 2012, there was 1 blowout that met the 100 plant minimum. In the blowout penstemon recovery plan, one of the recovery goals is to maintain a minimum of 10 population groups, each with a minimum of 300 plants that are documented to be naturally reproducing and self-sustaining. On the refuge, there are 9 population groups (blowouts with penstemon that are within 1.5 km of one another). At present, none of these groups would meet the 300 plant minimum of the recovery plan.

Given the hot and extremely dry conditions experienced in 2012, it will be interesting to see if there is an impact on blowout penstemon in 2013. In addition to conducting surveys for plants in 2013, an attempt should be made to assess available blowout habitat on the refuge, with an emphasis on identifying the largest and most active blowouts. In her Ph.D. dissertation, Kottas (2008) suggests that blowouts that are at least 600 m<sup>2</sup> have a greater probability of supporting a population of blowout penstemon. Photographs of all existing penstemon plantings should be taken to compare with past photos. If plant numbers continue to fall, it may be necessary to work with the plant nursery at Nebraska National Forest to obtain some more seedlings to transplant, or try some experiments with planting seed.

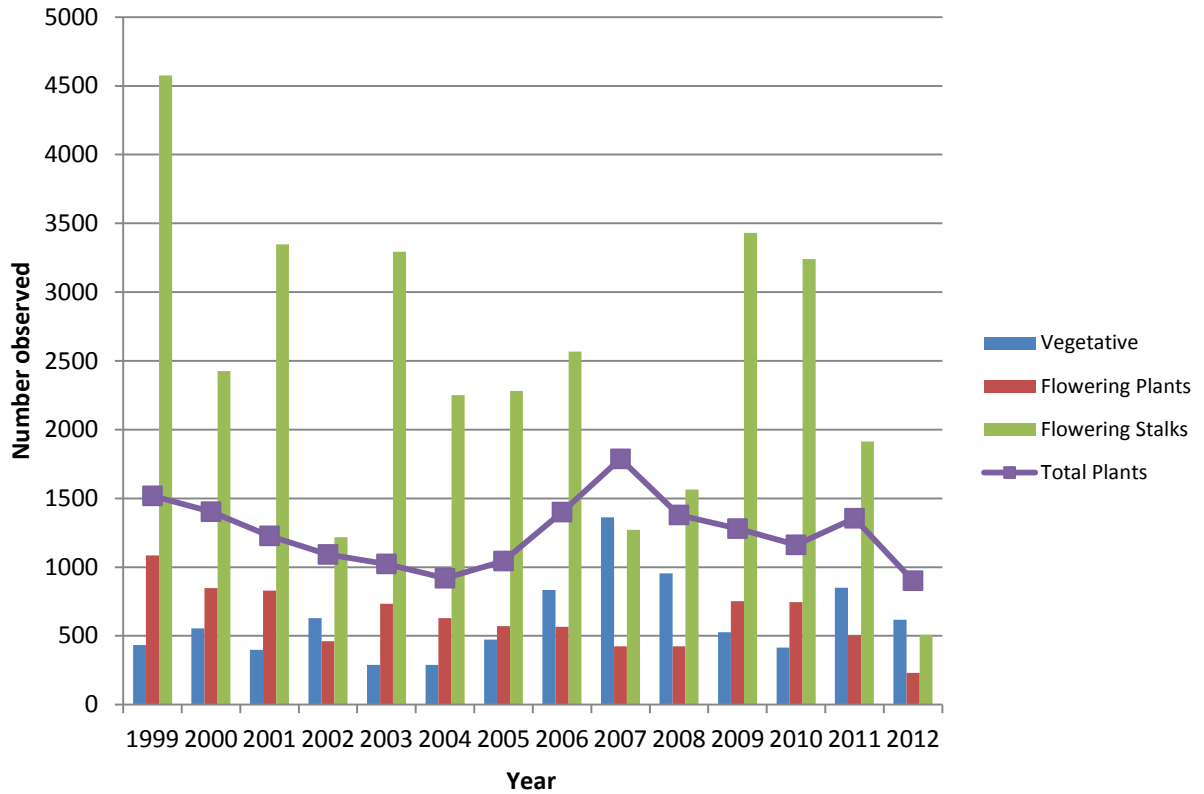
The data for blowout penstemon are stored on the GIS computer, in an Excel file named 'Blowout penstemon database' (C:\RLGIS\Vegetation Monitoring\Penstemon\Blowout penstemon database). There is also spatial data in RLGIS under Endangered Species Critical Habitat Designation. This data is also located in (C:\RLGIS\Vegetation Monitoring\Penstemon\penstemon2010). This spatial data shows where all the blowouts occur on the refuge, what their acreage is, and what their respective names are. An Excel spreadsheet 'Blowout penstemon database' found on the refuge biologist's computer (C:\Documents and Settings\nennemanm\My Documents\mel\Work files\Vegetation monitoring\Blowout penstemon) has all of the penstemon survey data.

Figure 1. Counts of transplanted blowout penstemon on Valentine NWR, summer 2012

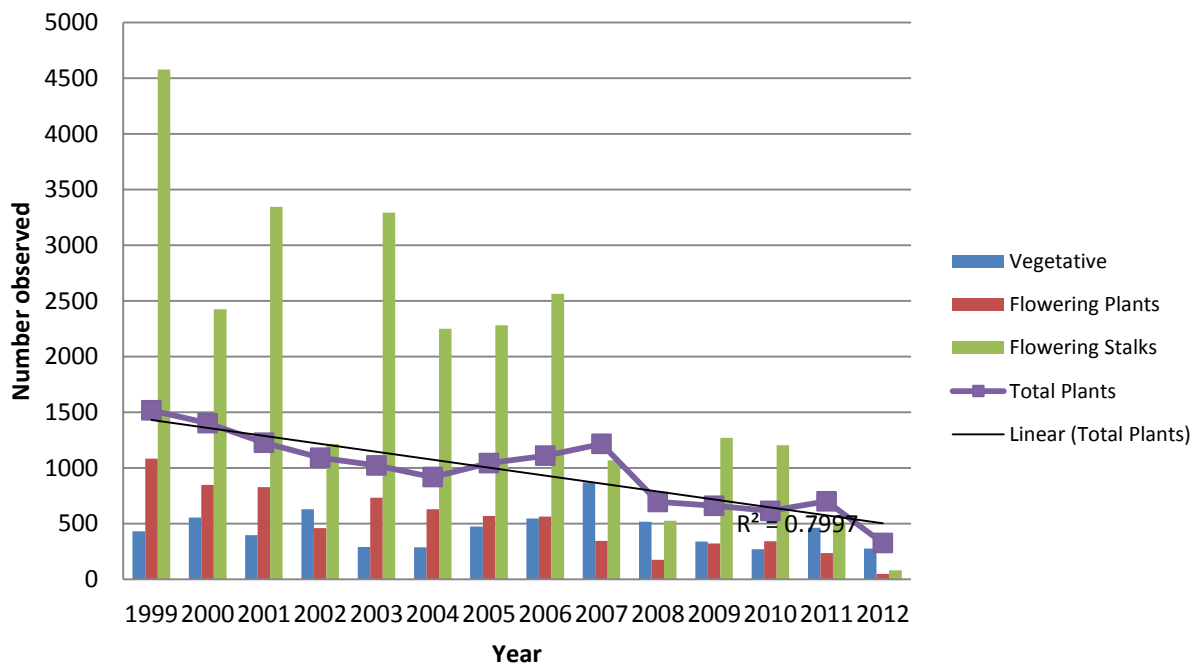




**Figure 2. Counts of vegetative and flowering plants, plus the total number of flowering stems of blowout penstemon transplanted on Valentine NWR**



**Figure 3. Counts of vegetative and flowering plants, plus the total number of flowering stems of blowout penstemon transplanted on Valentine NWR. Does not include transplants from 2005-2009.**



f. Wolves

Wolves were extirpated from Nebraska in the mid- to late 1800's. There is an occasional wolf sighting documented in Nebraska, but none near the refuge.

g. American Burying Beetle

The endangered American Burying Beetle (ABB) has been documented on Valentine NWR, and trapping in 2005 and 2010 provided some measure of their distribution across the refuge. No trapping or observations of ABB were made in 2012.

3. Waterfowl

Large numbers of trumpeter swans were present across the refuge during the November. We counted 34 on Hackberry Lake on November 16. It was interesting to watch the swans feeding accompanied by ducks and coots feeding on what was stirred up.

a. Ducks

Waterfowl pair and brood counts were again conducted on West Long, Hackberry, Pony, Center, and “21” lakes, the Marsh lakes, and at Yellowthroat Wildlife Management Area. Pair counts were conducted 16 May – 01 Jun, while two brood count surveys were done 15 June – 29 Jun and again 17 Jul – 31 Jul. On the refuge portion of the survey, there were 228 indicated pairs of blue-winged teal observed, 132 indicated pairs of mallards, 412 indicated pairs of dabbling ducks, 7 pairs of diving ducks, and 57 pairs of American coots. A simple extrapolation of these numbers based on the percentage of wetland area surveyed provides an estimate of 1519 dabbling duck pairs and 26 diver pairs for the refuge. While these estimates do not account for observer differences and the problem of ducks present but not detected, they do provide a basis for comparison from year to year, and serve to show that waterfowl breeding populations are well below desired levels. Valentine NWR CCP objectives for waterfowl include providing habitat to support greater than 4000 pairs of dabbling ducks, and 700 pairs of diving ducks, with a brood:pair ratio greater than 20%. Across the six refuge lakes surveyed, a total of 77 duck broods were observed. A simple extrapolation of this number for the refuge provides an estimate of 258 total broods, with a brood:pair ratio of 18.5%. While data collected on waterfowl pairs and broods very likely have problems associated with different observers and detection biases, they still serve as an index of current waterfowl use and production. Comparison of observations on the Marsh Lakes in 2012 to past data indicates that the number of pairs and number of broods has declined rather dramatically over the years (Table G3a1). It is thought that the entry of common carp into the lakes has greatly impacted the suitability of Marsh Lakes for waterfowl through the reduction of available invertebrate biomass, changes in and loss of submergent and emergent aquatic vegetation, and decline in water quality. However, other lakes included in the surveys also have fewer duck pairs and lower numbers of broods seen than in past surveys, so carp may not be the only factor driving the reduced waterfowl use. While the number of pairs and broods is still lower than objective levels, the number of broods observed did make a substantial jump in 2012, and the brood:pair ratio of 18.5% approaches CCP objectives. It is possible that the unusually warm weather experienced in Mar and April allowed ducks to begin nesting earlier, when they tend to have better nest success.

Table G3a1. Pair and brood count data on the Marsh Lakes						
	BWTE	MALL	Dabbling	Diving	Coot	Broods
2000	420	560	1406	53	196	87
2001	190	338	732	42	214	NA
Average*	397	222	805	135	300	NA
2008	39	41	125	18	4	1
2009	75	79	156	4	1	7
2010	75	59	157	4	3	2
2011	137	109	301	12	54	6
2012	142	55	233	4	48	40
*Average is pair counts on Marsh Lakes from 1968-2001, excluding 1972-1977						

b. Geese

No surveys were conducted specifically for Canada geese in 2012. General observations indicated that pairs of Canada geese have spread out across the refuge as holes open up in the ice. With the return/rebound in muskrats on the refuge, muskrat huts are providing an abundance of suitable nesting locations for geese. The first goose brood observed on the refuge was a pair with 7 goslings near Pony Lake on 23 April. Two nests with 6 eggs each were observed while conducting waterfowl pair counts on Hackberry Lake on 18 May, and 9 goose broods were observed at West Long Lake on 16 May. Twelve goose broods were observed while conducting waterfowl brood counts in mid-late June. Canada geese can generally be found on the refuge whenever open water is available. Larger groups are seen during the spring and fall migrations, with pairs and family groups present through the summer.

c. Trumpeter Swan

Trumpeter swans began arriving back on the refuge in early March as open water became available in refuge lakes. The refuge staff keeps anecdotal observations of swans through the year. In 2012, there were very few swan observations. Swans were observed on West Long, “21”, and the Marsh lakes during waterfowl brood counts, but no cygnets were spotted. A pair was spotted on Watts Lake with one cygnet on 05 Jul, but on 09 Aug a pair was again seen on Watts Lake with no cygnet. Swan pairs were not observed in their normal locations at Center, East Sweetwater, and East Long lakes. It seems unusual that in a year following the best observed production on the refuge (14 cygnets in 4 locations in 2011) that there would be no reproduction observed in 2012.

4. Marsh and Water Birds

A great blue heron rookery established in the cottonwood grove in HU 34E Trees. Adult herons were observed carrying sticks to nests on 10 April. A complete count of nests was not attempted, but there was an estimated 50 to 60 nests in the trees, and young birds were seen in many of the nests.

A double crested cormorant rookery established in flooded willow trees in the southwest end of South Marsh Lake in 2011, and was used again in 2012. During waterfowl pair counts on the Marsh Lakes on 25 May, 126 active cormorant nests were counted. Some nests still had eggs while others had nestlings. On 29 June, we observed about 560 cormorants on the Marsh Lakes, which would seem to indicate a pretty successful year for these birds. A month later, most of the cormorants had apparently dispersed from the Marsh Lakes, as only 44 were observed on 31 Jul.

A large number of western grebes were also observed nesting on the Marsh Lakes during waterfowl pair and brood counts. During brood counts conducted on 29 June, 280 adult and 287 juvenile (mostly downy) western grebes were counted across the three Marsh lakes. At the end of July, there were still 183 western grebes observed on these lakes.

Other marsh and water birds observed during waterfowl pair and brood counts: On the Marsh lakes, we observed flightless young of black-crowned night herons and American bitterns during the waterfowl brood count in late Jul. The number of white-faced ibis observed increased from 12 during pair counts in May to 39 during the last brood count in Jul, although no nesting colonies were located. Other marsh birds of note are American white pelicans, great blue herons, and cattle egrets.

On “21” lake, we observed >20 individuals for pied-billed grebes, white-faced ibis, American white pelican, black-crowned night heron, and great blue herons. Downy pied-billed grebes were observed.

a. Sandhill Cranes

No Sandhill Cranes were observed 23-25 March during the annual spring crane survey. This annual survey is done to assess Sandhill Crane numbers, and is conducted to capture most of the birds while they stage on the Platte River. Cranes are usually not seen migrating through this area until the second week of April. In the fall, cranes were observed migrating south during mid-October.

5. Shorebirds, Gulls, Terns and Allied Species

With warming temperatures and open water in March, more gulls were observed on the refuge. It appears that most of these are ring-billed gulls, but no close observation has been made to determine species. Ring-billed gulls, black and Forster's terns are the most observed species on the refuge through the summer. Black and Forster's terns are known to breed on the refuge, although no nesting colonies were located in 2012. Good numbers of both Forster's and black terns were observed on the Marsh lakes during waterfowl surveys, and young Forster's terns were seen.

## 6. Raptors

The pair of bald eagles nesting in Habitat Unit 34C1 trees raised two eaglets this year. They had practice nests here the past 2 years. This is the first recorded nest on the refuge in many, many years. The Vrenders Marsh nest just south of the refuge also raised 1 chick. The Gordon Creek nest west of the refuge was not successful. They built a huge nest this spring to replace the nest in a nearby tree that blew down last year. Reports on the nests were sent to Nebraska Game and Parks for their statewide monitoring effort. Three to four pairs of kestrels have been observed around tree groves on the refuge, and likely indicate breeding pairs. They have been seen at the 32A tree grove, north of Tom's Lake, by the Dewey Lake main boat launch, and at Hackberry HQ. Four great horned owl nests were noted across the refuge – one in HU 33 east of "21" Lake, one in the trees south of Calf Camp road in HU 16E3, one in HU 2B, and in a cottonwood tree at Hackberry HQ. Observations of raptors through the breeding season suggest that red-tailed hawks, Swainson's hawks, northern harriers, American kestrels, and great horned owls all breed on the refuge, although nests were not located for all of these species. Other secretive and less common species potentially breeding on the refuge include sharp-shinned and Cooper's hawks, long-eared, short-eared, and eastern screech owls. Short-eared owls are most often observed on the refuge during the non-breeding season.

## 7. Other Migratory Birds

In 1991-1992, a Breeding Bird Survey (BBS) route was implemented on Valentine NWR as part of the biological inventory conducted by National Biological Service (Bogan 1995). This route has been completed every year since 2003. In 2012, the route was completed on 08 Jun, with 1199 individual birds of 54 species detected. The average number of individuals and species observed for this route is 1004 individuals of 59 species. The most commonly observed bird was the Red-winged Blackbird, which comprised 49% of the total observations. Six other species (Marsh Wren, Mourning Dove, Dickcissel, Western Meadowlark, Brown-headed Cowbird and Yellow Headed Blackbird) had greater than 30 observations, and collectively comprised 31% of the total observations. BBS routes are useful for detecting trends in the more common species observed, and providing some information on the presence/absence of less common species. There were 31 species detected in the 1991-1992 surveys not detected in 2012, and four species detected in 2012 not detected in 1991-92, with 50 species in common between the two time periods. At least 17 of the 31 species from the 1991-92 surveys not detected in the 2012 BBS route were known to be on Valentine NWR in 2012, and the remaining 14 species are occasional breeders or birds typically seen at Valentine NWR during migration. The 1991-92 BBS routes were conducted in late May and early June

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on two consecutive days, which likely increased the number of species detected by 1) catching some late migrants (e.g. Least Flycatcher and Blackpoll Warbler), and 2) providing an additional amount of time to detect species when they are present. Of the four species not detected in 1991-92, the European Starling is an undesirable exotic associated with humans and tree cavities. The Trumpeter Swan has been expanding its range in recent years, with birds expanding across the Sandhills wetlands. In 1991-92, there was only a single pair known on Valentine NWR. In 2011, there were 4 breeding pairs, and in 2012 swans were observed at 4 locations on the refuge during the breeding season, although no cygnets were seen. Dickcissels are a somewhat nomadic species that can vary greatly in abundance from year to year, and have been fairly common at Valentine for the past 8 years. Chipping sparrows are a tree/shrub associated species, and may have increased over the last 20 years, although they are not very common on the refuge.

#### 8. Game Mammals

A possible elk track and elk antler rub was spotted and photographed along the south shore of Mule Lake. Several years ago a bull elk was seen on the refuge. The top of the rub was 6 feet up on the tree.



Photo G-8. Elk rub by Mule Lake. MLL

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a. Deer

No refuge deer surveys were conducted in 2012. Aerial deer surveys were conducted annually from 1968-1988, and were not repeated until 2005 and 2008, when concerns about CWD prompted some funding to determine deer numbers across the state. During the aerial surveys, the average number of deer seen was 166 (range 70-280). In the first three years of the survey, mule deer outnumbered white-tailed deer by about 2 to 1. More recently, white-tails have become the more abundant species, outnumbering mule deer about 4 to 1.

Rifle deer hunting is a popular activity on Valentine NWR, with most hunters focusing on antlered deer (Table F8.1). Of the 65 deer reported as harvested on the refuge in 2012, 57 were white-tailed deer, with 8 mule deer reported. It was good to see mule deer back in the harvest this year after none were harvested in 2011. Harvest pressure continues to be heavier in the Sandhills unit, with 42 deer coming out of this unit, and only 11 out of the Calamus West unit. Hunters are taking some nicer deer, as 19 (33%) of bucks were recorded as 3.5 years old, and an additional 4 (7%) bucks were unaged, but presumably were older deer that were being kept for taxidermy mounts. Twenty three (40%) bucks were aged at 2.5 years old, which seems to be the age that most hunters find to be an acceptably large buck (e.g. has enough antler). Eleven percent of the harvest was of female white-tailed deer. Deer harvest data are collected by the NGPC at check stations during rifle deer season. Muzzleloader and archery deer are now checked either by phone or internet, so data on location of harvest are not available for deer harvested on the refuge during these seasons and are not recorded in refuge harvest totals.

Table F 8.1. Deer harvest on Valentine NWR during the 2011 deer season. Harvest information based on deer reported to the state check stations. Archery and muzzleloader deer are now checked via telecheck, so some deer harvested on the refuge may not be included in these totals. Muzzleloader and archery harvest are now added anecdotally when we get reports.

Unit	White-tailed Deer		Mule Deer	
	Buck	Doe	Buck	Doe
Calamus W	8	3	0	0
Sandhills	33	3	6	0
State buck	5	0	1	0
Statewide youth	4	1	1	0

b. Muskrat and other furbearers

No muskrat house counts were conducted in 2012, but anecdotal observations indicate that muskrats have declined somewhat this year compared to the numbers seen in 2010 and 2011. The drought through the summer greatly reduced the amount of available habitat for muskrats as smaller wetlands dried up entirely, and the cattail/bulrush zone of many of the larger lakes was left dry as water levels fell. Rat houses provide nesting sites



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for many waterbirds, as well as loafing areas. Muskrat feeding activity also serves to open up dense patches of cattail and bulrush, creating openings that other wildlife use.

## 10. Other Resident Wildlife

### a. Prairie Grouse

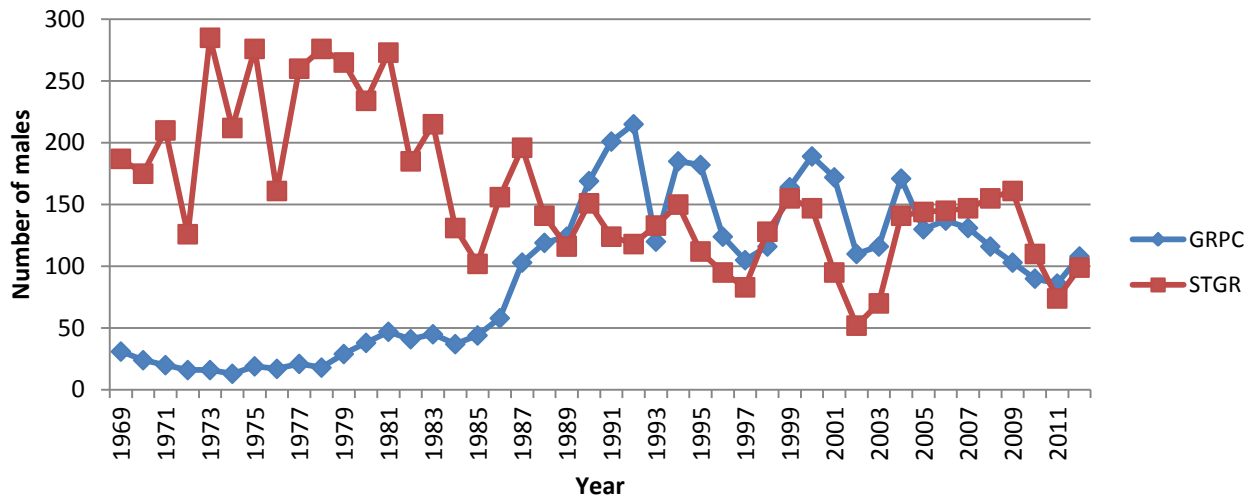
Greater Prairie Chickens (GPCH) and Sharp-tailed Grouse (STGR) occur in nearly equal numbers across Nebraska, with the prairie chicken being more abundant in the central and eastern grasslands. Sharp-tailed grouse are more abundant in the western part of the state, and throughout the Sandhills. Leks were checked in mid-March for placement of grouse viewing blinds, and blinds were placed southeast of Tom's Lake in HU 30A3 (STGR), and to the north of McKeel Lake in HU 16B2 (GPCH). Comments on the sheet placed in the blind are generally very positive, and most people really seem to enjoy spending an early morning with the grouse.

In the Valentine NWR CCP, the established objective for prairie grouse densities is to maintain a 5 year average of 1 prairie grouse lek/1.6 mi<sup>2</sup> within the State Survey Block, with a total of 15 GPCH leks and 13 STGR leks. In 2012, the 5 year average (2008-2012) was 1 prairie grouse lek/1.72 mi<sup>2</sup>, with 12 GPCH leks and 14 STGR leks. In 2012, there was 1 lek/1.77 mi<sup>2</sup> with 13 GPCH leks and 12 STGR leks. Thus in 2012 the lek density was lower than desired, and the number of GPCH and STGR leks were lower than CCP objectives. The total number of males observed on leks increased for both prairie grouse species in 2012 from 2011 numbers (Fig 10a1), and numbers observed are within the 95% confidence interval for each species. However, when comparing the number of males observed in 2012 with the 20 year average, both species fall below the lower 95% confidence interval of the mean number of male grouse observed. Also of note is that the number of leks located for both species in 2012 is lower than the objective levels in the CCP. The cause of the changes observed in prairie grouse numbers cannot be unequivocally stated. Retired biologist Len McDaniel (personal communication) has suggested that the decrease in the number of STGR observed in the early to mid 1980s could be attributed at least in part to a reduction in mowing of meadows for hay, which caused leks to relocate to areas in the dunes where they are not as easily found. Changes in grazing and haying management were also cited as a potential driver of the increase in GPCH numbers during about the same time period. Trends for both species over the last 20 years are harder to assess, as numbers of males on leks has bounced around considerably. Both grouse species saw low numbers on leks in 2002, which was an extremely dry year. STGR numbers increased quickly in the two years following, and then showed a steady to slowly increasing count, followed by two years of rather sharp decline before rebounding somewhat in 2012. GPCH numbers also increased sharply following the drought, but then showed a steady decline until 2012, when numbers recovered slightly.

Wing boxes were placed out at 5 locations on Valentine NWR to allow hunters to voluntarily submit wings from harvested grouse. Wing returns provide some measure of

hunting success and an indication of the grouse harvest (we have no way of knowing the percentage of hunters who don't submit harvest information). In addition, the wings are used to determine the species composition of birds harvested, and allows the ratio of juvenile birds:adult birds to be calculated as an index of grouse production for the year. The CCP objective is to achieve a minimum sample of 350 prairie grouse wings, with a harvest ratio  $\geq 2.5$  juveniles per adult. In 2012, there were 117 hunters reported on submitted envelopes, with 140 prairie grouse harvested (122 STGR, 13 GPCH, 5 unknown). The juvenile:adult ratio was 1.7:1. Overall harvest was well below the CCP objective, even with the hunting season extended by a month. This was the third year that grouse hunting was extended through the end of January; only 5 grouse were reported harvested in Jan, suggesting that the extended season is not greatly increasing harvest rates. The juvenile:adult ratio for 2012 was below objectives found in the CCP, suggesting that reproduction was below that necessary to maintain a healthy population. Juvenile:adult ratios on McKelvie and Halsey NF were only 0.85:1 and 0.76:1, respectively, which suggests nesting grouse fared poorly on the NF lands in 2012, which is not surprising given the drought conditions experienced across much of Nebraska. A component of not meeting the CCP harvest objective is undoubtedly a reduction in the number of grouse hunters. In the 20 years leading up to the completion of the CCP (1980-1999), the average number of hunters was 321 and the average grouse harvest was 445. Since 2000, the average number of hunters dropped to 183 and the average harvest dropped to 232. The average number of birds/hunter during these two time periods has decreased slightly during this time (1.38 birds/hunter 1980-1999, 1.25 birds/hunter 2000-2012). Interestingly, both McKelvie and Halsey NF have also seen a drop in the number of grouse hunters during these two time periods, although not as substantial as that observed on Valentine NWR. However, both NF areas have seen an increase in the number of birds harvested and the number of birds per hunter. Changing demographics in grouse hunters and perhaps prairie grouse populations may make the CCP objectives for the sample of prairie grouse wings unattainable in most years.

**Figure 10a1. Number of male prairie grouse observed on leks in the State Study Block, Valentine NWR 1969-2012**



Dr. Robert Gibson (professor/researcher from University of Nebraska-Lincoln) visited Valentine NWR in April to collect more data on stress hormone levels in displaying Sharp-tailed Grouse. He shared a poster titled “Lekking Sharp-tailed grouse lower stress-induced corticosterone during courtship display” presented at the Society for Integrative and Comparative Biology meeting. A summary of the poster follows.

From 2008-2012, sharp-tailed grouse were captured at lek sites on Valentine NWR. A blood sample was taken from each grouse within 3 minutes of capture, and another sample taken >30 minutes after capture. These samples were assayed to determine the levels of corticosterone in the blood to assess the initial levels and stress-induced levels. After blood samples were drawn, the birds were aged, sexed, measured, banded and released on site. Results showed that male STGR had higher initial levels of corticosterone than females, and that female grouse showed a large stress-induced increase in corticosterone levels that was not detected in males. The authors suggest that males may have higher initial corticosterone titers due to lekking activities, and that the lack of a response due to the stress of being held may represent a down-regulation stress response. Yearling males were found to have lower corticosterone titers than adult males throughout the breeding season, suggesting that young birds that are unlikely to

hold territories and breed utilize a physiological strategy that minimizes the corticosterone-mediated costs of lek display.

The authors suggest that during the seasonal peak of courtship display (and presumably the peak energy demand), male sharp-tailed grouse lower their stress response to capture, and possibly to human disturbance. They also suggest that the elevated corticosterone titers observed in male grouse, which resulted in a reduced stress response, might limit the diversion of resources away from lek display, and might limit the corticosterone-mediated fitness costs, including reduced immune and reproductive function.

This poster can be found in C:\Documents and Settings\nennemanm\My documents\mel\work files\Birds\prairie grouse\Gibson data\SICB sharptail poster.pdf.

b. Ring-necked Pheasant

Pheasant season was open on Valentine NWR through the end of the January. No records of pheasant hunting are kept, but it is thought that the pheasant harvest may be similar to the grouse harvest numbers. Late in the season, pheasants seem to gather in large numbers in a few places on the refuge, generally where food resources are adjacent to good thermal cover. Pheasants apparently fared better in 2012 than in 2011, as the birds were somewhat easier to find during the fall hunting season.

c. Merriam's Turkey

Tom turkeys begin to strut and gobble in March and early April. Turkeys are not overly abundant on Valentine NWR, and their activities are generally confined to areas where they have access to trees. They are most commonly observed on the south side of Hackberry Lake, near the Pelican Lake sub-headquarters, near the main boat launch on Dewey Lake, and in the vicinity of the Pony Lake sub-headquarters. No surveys are done to document turkey populations on Valentine NWR. No hunting of turkeys is allowed on the refuge.

d. Gray partridge and Bobwhite Quail

Bobwhite quail are not common on Valentine NWR, so seeing them is a noteworthy event for refuge staff. The refuge likely does not provide the best habitat for quail, as they probably fare better where there are more shrubs in the landscape. No observations of quail or gray partridge were made in 2012.

e. Reptiles, amphibians, and others

## 2012 Calling Amphibian Monitoring on Valentine NWR

Little information exists on Valentine NWR regarding the reptiles and amphibians that live on the refuge. Much of what is known comes from anecdotal observations of these animals during other field activities, and these often are not recorded. One of the broad objectives established in the 1999 Comprehensive Conservation Plan for Valentine NWR is to “Ensure the diversity and abundance of indigenous mammals, reptiles, amphibians, fish, and invertebrates remains intact. Establish average densities of key indicator species to document baseline levels and to determine subsequent population trends” (Valentine NWR CCP 1999). Six species of amphibians were documented on Valentine NWR during a biological inventory of the refuge in 1991-92 (Tiger salamander, Woodhouse’s toad, Plains spadefoot, Western/boreal chorus frog, Bullfrog, and Northern leopard frog; Corn et al 1995). Since all of the frogs and toads vocalize during the breeding season, calling amphibian survey routes were established on Valentine NWR in 2009 to provide some baseline information on the abundance and distribution of these species on the refuge.

The protocol used follows the North American Amphibian Monitoring Project protocol, which utilizes a series of randomly selected survey routes along existing roads with listening stops every ½ mile. Since there are only a few roads on Valentine NWR, survey points were established along almost all readily traveled roads. In most places, stops were established every ½ mile, except where roads passed through sandhills with no wetland habitat; here stops were spaced farther apart to skip these areas. The survey routes are called the Little Hay route, designated as stops 1-27; the Calf Camp route, with stops 28-52, and the Pony Lake route, with stops 53-69 (Appendix 1). A shapefile of these survey points is located on the Valentine NWR GIS computer in C:\RLGIS\temp\Amphibian survey route.shp. Surveys are conducted at each stop 1 or more times each year to record species heard, and each species heard is assigned a calling index. Each stop is 5 minutes, beginning ½ hour after sunset. Full details of the protocol can be found on the biologist computer (C:\Documents and Settings\nennemanm\My Documents\mel\Work files\Amphibians\Calling amphibian survey protocol for Valentine NWR). Surveys should be timed to capture when the different species are calling, which could involve running the survey routes 2 or 3 times.

The amphibian survey routes were completed only one time during 2012, from 9-18 July. Bullfrogs were the only species detected during these surveys. The Little Hay and Calf Camp survey routes were split into 2 surveys so that they could be completed before 1:00 a.m., as per protocol. Conducting these routes in full pushed the end time well past 1:00. Another change in the protocol was that the stop length was decreased from 5 minutes to 3 minutes. This was done after conducting a test run of half of the Little Hay Route where stops of 3 and 5 minutes were done. Since the longer stops did not change the calling index recorded, it was decided to reduce the stop time. A similar test should be conducted before reducing the stop time for species other than bullfrogs.

Bullfrogs were detected at 65% of all stops in 2012, with an average calling index of 1.3. If only stops where bullfrogs were detected are used, the calling index value for bullfrogs increases to 2.0 (Table 1). Bullfrogs were detected at 10 locations where they were not previously found (2009 and 2011 surveys), and were not detected at 7 locations where they had been detected in previous surveys (Figs 1-3). Compared to previous surveys,

bullfrogs were detected at a greater number of survey points in 2012, but with a somewhat lower abundance. New detections of bullfrogs indicated that the species appears to be pioneering eastward on the refuge. Bullfrogs were detected all through the Little Hay Valley and east of Hwy 83 at North Marsh Lake. New calling detections were also made near Center and “21” lakes, and at Cow Lake. The majority of bullfrogs still appear to be concentrated in the northwest corner of the refuge, in association with the fishing lakes.

Larval and metamorphosing amphibians were observed at several locations across the refuge in 2012. Bullfrog tadpoles were observed in the pond east of the Calf Camp dike water control structure, and just above the water control structure at West Long Lake. Bullfrog tadpoles were also spotted in some of the wetlands in the hills along the east end trail road in HU 33. Many of these tadpoles died as the ponds dried up due to drought conditions. A diverse group of amphibians were observed in a borrow pit wetland along the School Lake Cut across road on 25 Jun. Dip net samples turned up larval tiger salamanders (Fig 4), northern leopard frog tadpoles (Fig 5), and woodhouse’s toad tadpoles. In a follow-up visit, many recently metamorphosed woodhouse’s toads were observed near the drying pond.

Additional information on bullfrogs was collected by biological technician Alyx Lingenfelter. She documented bullfrogs in nearly all refuge lakes by sight during 2012. The only lakes she did not find bullfrogs were Dew and East Long lakes, at the eastern end of the refuge. Lingenfelter also conducted sampling of bullfrogs for the presence of the chytrid bacterium, which has been implicated in the death of amphibians around the world. Chytrid was detected on Valentine NWR, and the prevalence during early June was high (74%), while the overall detection was 31%. The overall impact of chytrid on refuge amphibians is unknown, but refuge personnel should be aware that the bacteria is present and to be on the lookout for amphibian die-offs.

### Recommendations

Continue running the Little Hay and Calf Camp routes as two routes with 12-14 stops each. The Pony Lake route has 17 stops, and can be completed before 1:00 am. The North American Amphibian Monitoring Program protocol recommends that each route have only 10 stops. Splitting the routes increases the number of survey nights, but allows the routes to be finished well before 1:00 am. Also continue the use of 3 minute survey stops for bullfrogs. Follow the original 5 minute stop for all other species unless it is determined that 3 minutes adequately captures their calls as well.

Try to conduct surveys after a rainfall event, especially for Woodhouse’s toads and plains spadefoots. Spadefoots should be on the refuge, but were not detected during any of the calling amphibian surveys in 2009 and 2011. The NAAMP protocol specifically recommends that surveys should occur within 3 days of a rainfall event in the Great Plains.

Consider other areas on the refuge where routes of 10 or so points could be placed, and then randomly select routes. Routes could include existing windmill service trails, or go through valleys on the refuge (e.g. East Sweetwater or Cow Lake/King Flats). This would provide data to be more representative of the whole refuge (data could be extrapolated to the refuge as a whole). The current routes are basically a convenience sample, which limits the scope of inference to the areas surveyed. The current routes can

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be safely completed by employees in the dark, and are providing good information on the distribution and abundance of calling amphibians in the areas surveyed. Other routes and survey points scattered more widely across the refuge could introduce more hazards associated with travel (e.g. driving cross country at night on an ATV, navigating by GPS), and could take more nights to complete.

Table 1. Calling amphibians on Valentine NWR in 2009 and 2011-2012. The percentage of stops heard provides an indication of how widespread a species is, and the average calling index (0= no frogs or toads heard, 1 = individual frogs can be counted and there is a gap between calls, 2 = individuals can be distinguished but there is some overlapping of calls, 3 = full chorus, calls are constant, continuous, and overlapping) provides a measure of how abundant the species are on the refuge. The calling index with locations where a species was detected provides a measure of abundance where the species were found.

Species	Year	Percent of stops heard	Average calling index	Average calling index where species was detected
Bullfrog	2009	55	1.49	2.71
Bullfrog	2011	54	1.14	2.14
Bullfrog	2012	65	1.28	1.96
Northern Leopard Frog	2011	65	0.78	1.20
Boreal Chorus Frog	2011	96	2.67	2.79
Woodhouse's Toad	2011	22	0.46	2.13

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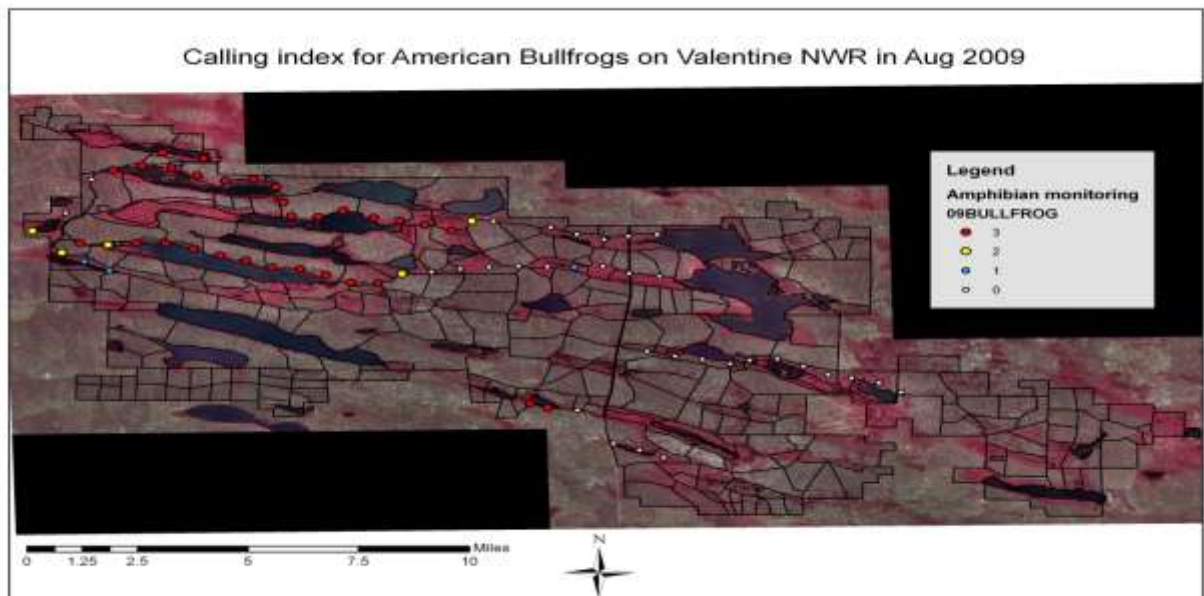


Figure 1. Distribution and calling index for bullfrogs on calling amphibian survey routes at Valentine NWR in 2009.

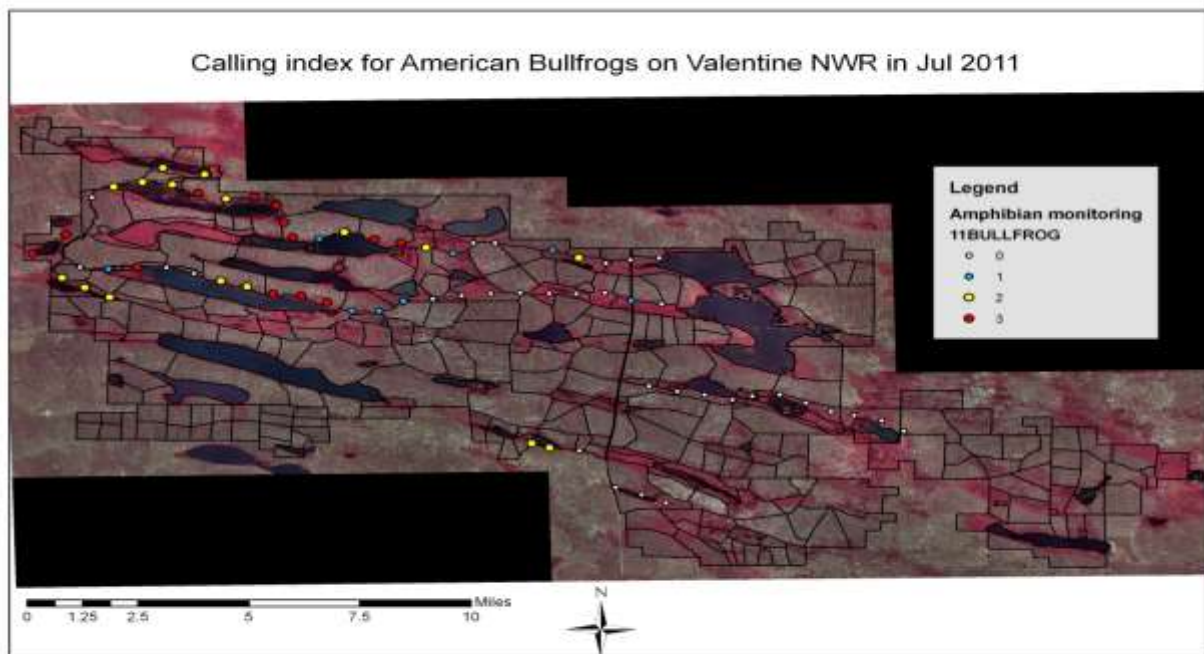


Figure 2. Distribution and calling index for bullfrogs on calling amphibian survey routes at Valentine NWR in 2011.



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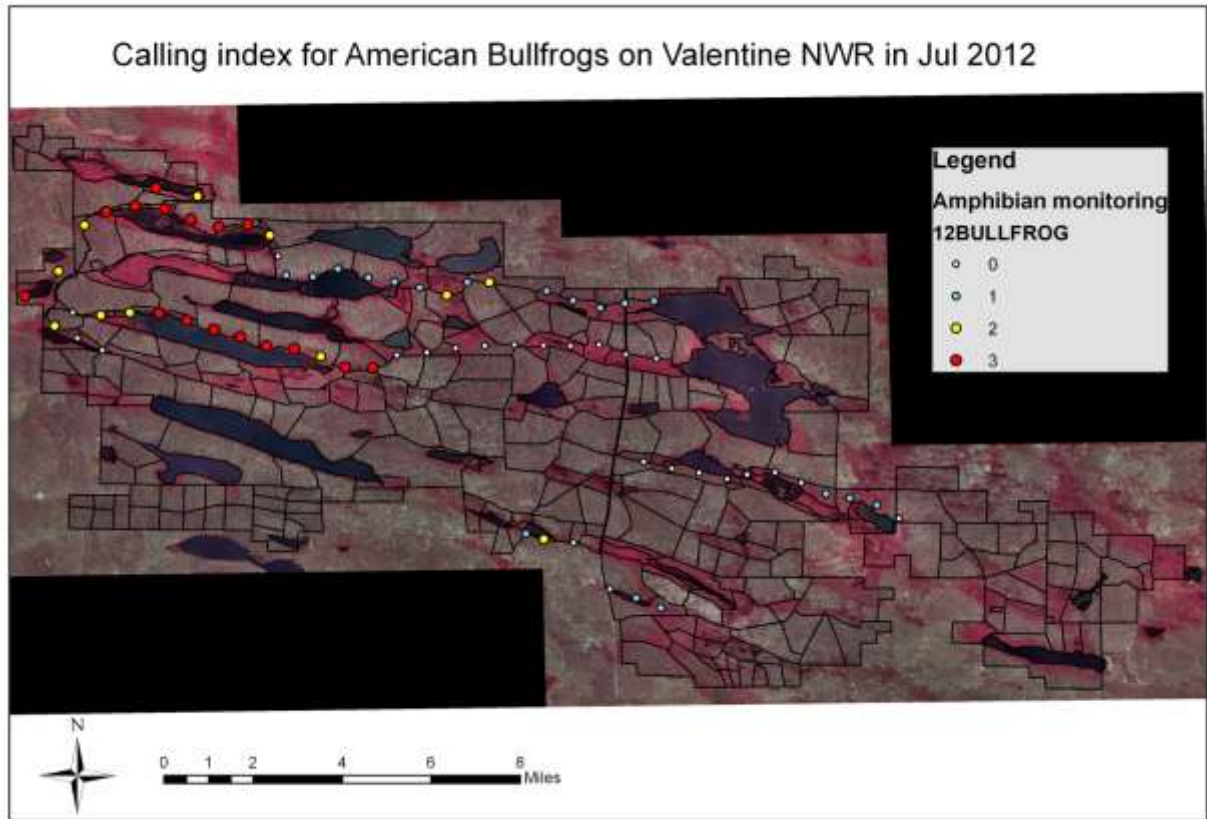


Figure 3. Distribution and calling index for bullfrogs on calling amphibian survey routes at Valentine NWR in 2012.

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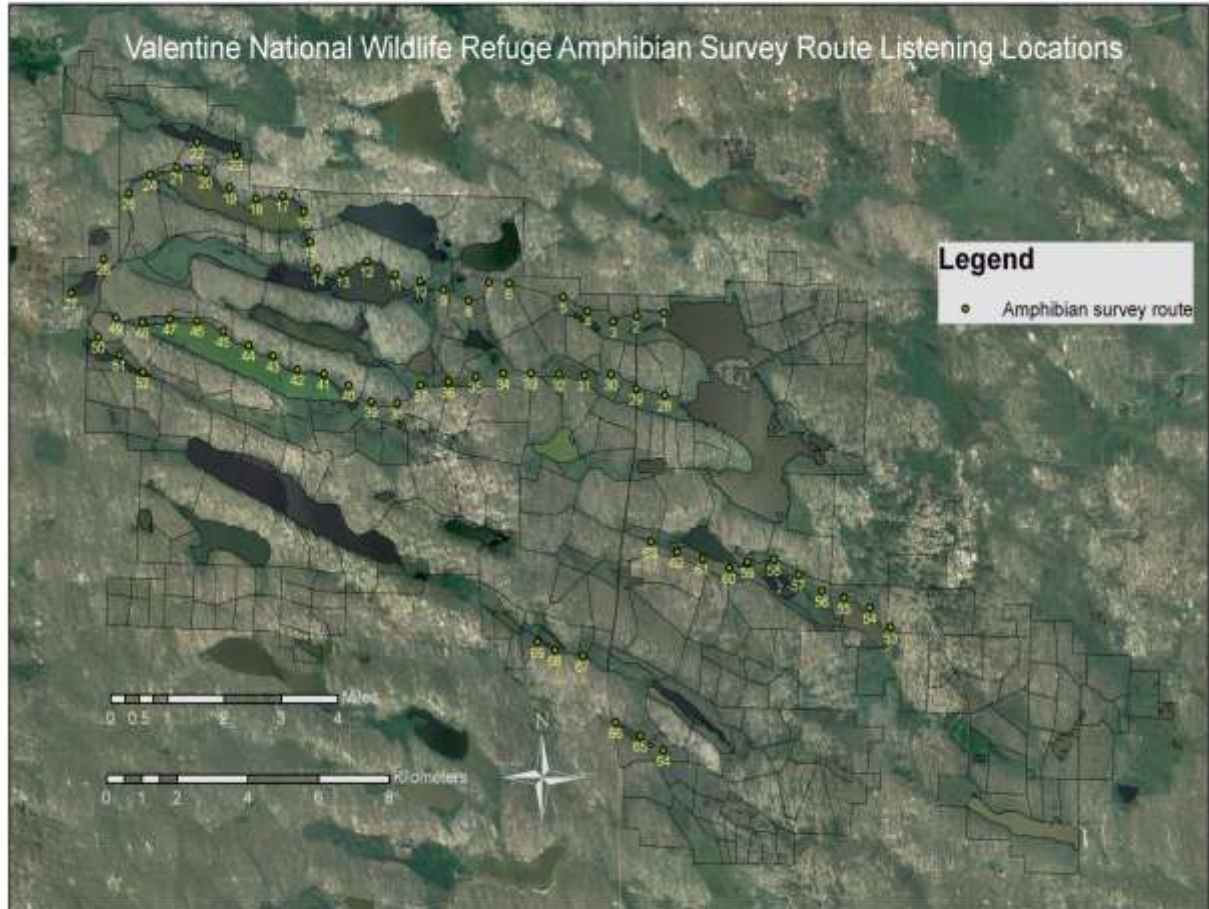
Figure 4. Larval tiger salamander found in the borrow pit wetland along School Lake cut across road on 25 Jun 2012.



Figure 5. Northern leopard frog tadpole found in the borrow pit wetland along the School Lake cut across road on 25 Jun 2012.

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Appendix 1. Amphibian survey routes on Valentine NWR. The Little Hay route includes stops 1-27, the Calf Camp route stops 28-52, and the Pony Lake route stops 53-69.



Other observations of reptiles and amphibians are anecdotal. Bull snakes, garter snakes, yellow-bellied racers were all observed on the refuge through the summer, with bull snakes and garter snakes the most commonly observed. A few yellow mud turtles are typically seen on the roads in April. Snapping and painted turtles are readily observed in June as they come ashore to lay eggs. During blowout penstemon surveys, prairie and earless lizards are often observed, as well as the occasional prairie racerunner.

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## **11. Fisheries Resources**

The annual fisheries meeting was held on February 28 at the Niobrara Lodge in Valentine. Due to bad weather several presenters attended via Power Point and phone. Agenda items included fishing access improvements, results of fisheries surveys, fisheries research results, the Vision document, and Kid's Fishing Day. The meeting was attended by about 25 FWS, USGS COOP Unit, Game and Parks, and SDSU staff. Following the meeting Lindvall met with USGS COOP staff to discuss possible research on carp control.

We submitted a Science Support Program grant proposal in cooperation with the University of Nebraska COOP Unit for an integrated pest management approach to carp control in the Marsh Lakes. The proposal was not funded. The Marsh Lakes are potentially the best waterfowl habitat on the refuge. High carp populations have had a severe negative impact on the habitat.

The Nebraska Game and Parks Commission operates a fish hatchery in the town of Valentine and collects fish for brood stock from the refuge fishing lakes. A report on their activities follows:

We caught black crappie in Hackberry Lake while collecting perch for hatchery operations. Several 8 inch crappie were caught. The source of the new fish for this lake is unknown but could be from "bucket biologists". Northern pike were also not stocked and are now common in Hackberry Lake.

On March 12<sup>th</sup> Valentine Hatchery and NGPC staff set 12 nets on Pelican Lake.

	<u>Water Temp</u>	<u>males</u>	<u>ripe females</u>	<u>grn females</u>	<u>spent females</u>
<u>March 13<sup>th</sup>:</u>	48 F	202	5	--	1
<u>March 14<sup>th</sup>:</u>	48 F	237	22	43	--
<u>March 15<sup>th</sup>:</u>	48 F	152	29	28	7
<u>March 16<sup>th</sup>:</u>	48 F	193	35	16	21
<u>March 17<sup>th</sup>:</u>	49 F	181	32	10	33
<b>Pulled on 03-17-2012</b>					
<b>TOTALS</b>		<b>965</b>	<b>123</b>	<b>97</b>	<b>62</b>

Northern Pike eggs were shipped to the Calamus and North Platte Hatcheries. Hatches ranged from 6.2% all the way up to 87%. Different spawning methods using a regular buffer solution, a hot buffer solution, a .6% saline solution, with masticated milt, fresh squirted milt, and spooned milt. We also used northern pike from Merritt Reservoir as well. Tiger Musky was produced using male musky from Merritt and 5 female northern pike from Pelican Lake. The pH of Pelican Lake was 7.5 at 48 F water temps. On March 13<sup>th</sup> the air temp rose to 81 F. We did have a hatch this year but it varied with each lot.

On March 12<sup>th</sup> the Valentine Hatchery set 12 nets at West Long Lake. Water temps were 46 F. All nets were pulled on March 16<sup>th</sup>.

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	<b><u>WEST LONG:</u></b>				
	<b><u>Yep males</u></b>	<b><u>Yep females</u></b>	<b><u>Bluegill</u></b>	<b><u>Largemouth</u></b>	<b><u>Northern</u></b>
<b><u>March 13<sup>th</sup>:</u></b>	30	31	30	20	11
<b><u>March 14<sup>th</sup>:</u></b>	29	25	--	--	13
<b><u>March 15<sup>th</sup>:</u></b>	29	24	--	--	14
<b><u>March 16<sup>th</sup>:</u></b>	69	29	--	--	10
<b><u>TOTALS</u></b>	<b>157</b>	<b>109</b>	<b>30</b>	<b>20</b>	<b>48</b>

(30 yellow perch, 30 bluegill and 20 largemouth were sent to the Aksarben Aquarium). All northern pike were removed from West Long.

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At this point we did not collect the number of yellow perch spawners needed for our number of eggs requested. We decided to set nets at Hackberry Lake due to the lack of spawners caught at West Long. Ten nets were set on March 26<sup>th</sup> on the west end of Hackberry and pulled on March 29<sup>th</sup>. Water temps were 53 F.

	<b><u>HACKBERRY LAKE:</u></b>		
	<b><u>Yep males</u></b>	<b><u>Yep females</u></b>	<b><u>Spent Yep females</u></b>
<b><u>March 27<sup>th</sup>:</u></b>	70	20	10
<b><u>March 28<sup>th</sup>:</u></b>	18	12	didn't count
<b><u>March 29<sup>th</sup>:</u></b>	33	15	didn't count
<b><u>TOTALS:</u></b>	<b>121</b>	<b>47</b>	<b>LOTS (didn't count)</b>

On March 28<sup>th</sup>, we caught at least 6 Black Crappie in Hackberry Lake in the 10 nets. We also went back to West Long and reset 10 more nets for one more day on March 28<sup>th</sup> then pulled out on March 29<sup>th</sup>.

	<b><u>WEST LONG</u></b>	
	<b><u>Yep females</u></b>	<b><u>Northern Pike</u></b>
<b><u>March 29<sup>th</sup>:</u></b>	25	3

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**WEST LONG TOTALS:**

	<b><u>Yep males</u></b>	<b><u>Yep females</u></b>	<b><u>Bluegill</u></b>	<b><u>Largemouth</u></b>	<b><u>Northern</u></b>
	157	134	30	20	51

**HACKBERRY TOTALS:**

<b><u>Yep males</u></b>	<b><u>Yep females</u></b>	<b><u>Spent Yep females</u></b>	<b><u>Black Crappie</u></b>
121	47	10+ (didn't count all)	6+

The Valentine Hatchery was still short on the number of spawners needed so we went to a private lake and finished up. Our goal was to get 60.5 quarts of yellow perch eggs. At an average of .25 quarts (per female) we needed approximately 250 females. We did catch a lot of nice bluegill and bass in West Long and a lot of snappers in Hackberry! During our time on Hackberry, we had a lot of perch females spawning on top of the net as well as inside the trap nets. Water temps were 54 F when the traps were pulled. Pierre Fisheries Assistance biologists were here and conducted spring electro-fishing and trap net surveys on some of the refuge fishing lakes. Game and Parks also surveyed carp of several lakes and ran trap nets on Willow and Rice Lakes. Willow and Rice have not been surveyed in years.



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A fish kill was observed on Watts Lake in the fall. The water was very shallow and the vegetation very thick on the east end of the lake. About 20 dead fish were counted along about 500 yards of shoreline, bass, pike, carp, and perch. Both small and large fish were present. They looked to have been dead for a while and most had been scavenged. There were also quite a few gulls in the area that may have removed some of the dead fish.

On November 20, Nebraska Game and Parks brought down an electro-shocking boat to sample fish in Watts Lake. Due to the partial fish kill this fall we were considering renovation as the lake level is low. The sampling found good numbers of bass, bluegill, perch, northern pike, and some carp. It was decided not to do a renovation at this time. If we have winter kill we may try to do the renovation in the spring.

Duck, Hackberry, West Long, Rice, and Dewey lakes were checked for fish mortality on October 29 by walking 500 yards of shoreline at each lake. No dead fish were observed on these lakes. Willow and Pelican had too much vegetation and muck to walk the shoreline so were not checked. Mark Kaeminck and Manager Lindvall ran clover leaf traps on Pelican on October 4 and 5 using the airboat and did not observe a fish kill.

This year we started on an Aquatic Habitat Project with the Nebraska Game and Parks. A memorandum of understanding was prepared for the project. This will be a long term project with the goal of better managing the 9 refuge lakes open to fishing through carp control and water level management. The work will benefit water management, fisheries, and wildlife. The feasibility of replacing the water control structure on Willow Lake is a large part of the proposal. Nebraska Game and Parks is paying for the work using Aquatic Habitat Funds. The following work was completed this year.

Nebraska Game and Parks arranged for and paid for a Lidar survey of the fishing lakes portion of the refuge. They also did aerial photography. The survey will be used to plan for carp barriers between lakes, water control structure replacement or rehab, and planning for dike renovations.

A request for proposals was prepared and sent out to prospective consulting firms. Three consultants visited the refuge, prepared proposals, and were interviewed. One contractor was selected and started work in July. They will prepare a hydrographic model of the refuge fishing lakes, design new or make retrofit plans for existing water control structures, draft a carp management plan, prepare bid packages for construction, and supervise construction or repairs.

A kick off meeting was held on August 18 with staff from EA Engineering, Science, and Technology. EA received the contract to design and monitor construction for improved water and carp management on the refuge fishing lakes. They will receive approximately \$240,000 for their work. The meeting was a good one as we were able to better define our expectations, provide some historical information that is useful to the project, and outline some constraints that exist. EA also had a survey team up to survey the existing water control structures and dikes.

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Biologist from the USFWS Great Plains Fish and Wildlife Conservation Office in Pierre, SD were down to survey the fishing lakes at Valentine NWR in both the spring and fall. They prepared a report "*2012 Fisheries Surveys Report Valentine National Wildlife Refuge, Nebraska*" by Daniel James. This year's report has good information on long term trends for a number of species. Summaries, for the lakes that were surveyed in 2012, follow.

#### Clear Lake

Due to low water levels boats could not be launched and no gill net surveys for pike, perch, and carp were conducted. Crappie have become established from stockings, abundance is low but size structure is improving. Bluegill abundance is average and size structure is increasing. Condition is excellent. Bass relative abundance is stable with some large fish present. Condition is excellent.

#### Dewey Lake

Carp relative abundance is stable but surveys indicate some recruitment of adults into the population. Pike relative abundance, size, and condition are relatively stable. Some increase in size can be attributed to the 28 inch size limit. Bluegill relative abundance was similar to the long term average. Size has slightly increased and condition remains satisfactory. Bass abundance was high and sizes are increasing but condition decreased. Perch abundance is down from the long term average, size structure is stable, and condition remained good.

#### Hackberry Lake

Carp abundance continued to show a decreasing trend with the current population consisting of a few large individuals with no observed recruitment. Multiple age classes of pike are present indicating reproduction and recruitment. Pike condition has decreased. Abundance, size structure, and condition all indicate a good bluegill population in the lake. Bass size structure shows a population of moderate to large sized bass. Condition has decreased but remains good. Yellow perch abundance has decreased about 50 percent and some large fish are present. Condition is satisfactory but no small perch were sampled indicating poor recruitment.

#### Pelican Lake

Due to low water levels and the difficulty in launching boats, no gill net surveys were conducted for carp, pike, or perch. Bluegill relative abundance remained stable. Size distribution indicates a population consists of a large range of lengths. Condition is satisfactory. Bass abundance was low compared to the lake average. Size structure shows a good number of larger bass with a young size class indicating reproduction. Condition is excellent.

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### Duck Lake

Bluegill relative abundance was higher but size and condition were both lower. Bass abundance remained high and is composed of larger fish. Condition was lower than average. Perch numbers are very low and stocking is recommended.

### West Long Lake

Due to low water levels and the difficulty in launching boats, gill net surveys for pike, carp, and bluegill were not conducted. Bluegill relative abundance was lower but size structure is increasing and condition is excellent. Bass relative abundance was similar to the long term average. A larger number of larger bass were sampled. Condition is still good.

#### 14. Scientific collections

#### 15. Animal control

#### 16. Marking and Banding

No activity to report

#### 17. Disease Prevention and Control

Due to changes in funding priorities, avian influenza surveillance was not conducted in 2012. Refuge staff still keep an eye out for wildlife disease or mortality on the refuge while conducting other work, even though no specific disease surveillance is being conducted. No significant mortality was noted on the refuge in 2012. There were a small number (6-7) of dead western grebes noted on the Marsh Lakes during the second brood count on 31 Jul. One of these grebes appeared to be weak/sick at the beginning of the survey, and was found dead at the end of the survey. This bird was collected and sent into the Wildlife Health Lab in Madison, WI. The necropsy report indicated that the immature female western grebe was emaciated, but there was no evidence of infectious disease. No further mortality was noted on the Marsh Lakes in 2012, although follow-up visits were not done until surveying for invasive phragmites and purple loosestrife was conducted in August.

EHD has been killing deer both on and off the refuge. The disease is more prevalent in drought years. Nebraska Game and Parks reduced deer permits in response to the die off. We received many calls from deer hunters concerning the impact of the disease on the



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upcoming rifle deer season. In past years, we have not seen a big drop in deer harvest due to EHD.

By the end of the year we recorded 35 dead deer on the refuge that we presumed died of EHD over the summer. We did not conduct searches but marked the location of the deer remains on a map so as not to double count. The count is from carcasses observed while doing refuge work or out hunting. It is likely only a fraction of the total mortality. The morality occurred all across the refuge.



Photo G-17. EHD killed deer along the shoreline of Marsh Lakes. MLL

## H. PUBLIC USE

### 1. General

An article *Out of the Classroom and Into the Field* , on getting high school students out fishing, appeared in the January-February 2012 issue of Nebraskaland Magazine. The school has brought their students to the refuge several times for an ice fishing outing.

News releases sent out to area media outlets this year include the following:

*Blinds for Viewing Grouse Dances Available at Valentine National Wildlife Refuge*  
*Results of 2011 Fish Surveys on Valentine National Wildlife Refuge.*  
*Angler Access Projects at the Valentine National Wildlife Refuge*  
*Kid's Fishing Day at Fort Niobrara National Wildlife Refuge*  
*Valentine Refuge to Open for Trapping*

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Dr. Hank Sather visited the refuge on May 31. Dr. Sather wrote Wildlife Monograph Number 2 based work he did on muskrats here from 1948 – 1952. Refuge Biologist Retired Len McDaniel came down also. Dr. Sather had many great stories about his time here and work with Refuge Trapper Fuzzy Stillwell.



Photo H-1. Dr. Hank Sather and Refuge Biologist Retired Len McDaniel with Rice Lake, Sather's main study site, in the background. MLL

We worked with The Nature Conservancy and the Park Service to produce a new release on our four areas, the Niobrara Preserve, Nation Scenic River, and Fort Niobrara and Valentine NWRs being named as top 50 ecotourism sites in the Great Plains. Valentine NWR was named a TOP 50 Ecotourism Site in the Great Plains by the Center for Great Plains Studies. The sites were selected by surveying 51 naturalists familiar with the Great Plains.

A large scale map of Valentine National Wildlife Refuge was printed and is be available for sale by the Sandhills Prairie Refuge Association for \$10.00. We have many requests, mostly from hunters, for a detailed refuge map. The map costs \$10 retail and \$5.50 wholesale. Enough maps have been sold already to cover the cost of printing.

Visitor use information was sent in and will be used in the economic benefits study being conducted on the value of the refuge to the local economy. Unfortunately we do not have accurate visitor use numbers, only gross estimates.

The bird section of the Valentine NWR Wildlife Brochure was updated and sent in for changes and printing. Several new birds were added and the names changed to conform to the latest AOU checklist.

## **2. Outdoor Classrooms - Students**

Refuge Manager Lindvall taught the muzzle loader portion of Nebraska Hunter Safety to 18 students on July 23. This is his 32<sup>nd</sup> year of teaching the class.

The annual Kid's Fishing Day was held at Ft. Niobrara on September 8. We had about 45 children out for the morning. They fished, made fish print T shirts, won prizes at a casting contest, and learned fish cooking and cleaning. Fifteen volunteers helped with the activities. Snacks and prizes were contributed by the Sandhills Prairie Refuge Association and trout and loaner poles by the Nebraska Game and Parks Commission.

## **4. Interpretive Foot Trails**

The Civilian Conservation Corps Nature Trail goes from a parking area on the west end of Hackberry Lake to the old fire tower constructed by the CCC. An observation deck is located inside the legs of the tower and interpretive panels teach about the geology, habitats, and wildlife of the Sandhills. There are 15 interpretive signs located along the trail. This year plant identification markers were put up along the trail. The Sandhills Prairie Refuge Association donated the markers to the refuge.

A handicapped accessible nature trail is located at the Marsh Lakes Overlook. This short trail goes from the Overlook to the top of a small hill which offers a great view of the Marsh Lakes, the largest wetland complex in the Sandhills. An outdoor viewing scope and bench are located at the end of the nature trail.

## **5. Auto Tour Routes**

The Little Hay Road Wildlife Drive is 9.6 miles long and has 17 stops along the way. Stops are numbered and signed with fiberglass posts. Self guiding brochures are available at both ends of the road so visitors can go from Highway 83 to State Spur 16B or the other way also. The road is graveled but narrow and rough. The poor state of the road discourages some visitors. It is estimated that about 200 vehicles use the auto tour each year. The brochure was first available in 2011.

## **7. Other Interpretive Programs**

## **8. Hunting**

Waterfowl hunting is permitted on Watts, Rice, and Duck Lakes. Seasons and bag limits are the same as those set by the state. Duck season opened on October 6 with quite a few ducks but only one group of hunters on the refuge. The trend continued for the rest of the season. We had a split season back this year, October 8 – December 18, 2012 and January 2-23, 2013. There was a pretty spectacular waterfowl migration the fourth week of October, cranes, white-fronts, snows, Canadas, and all sorts of puddle and diving

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ducks. Refuge lakes and wetlands froze over in early December ending duck hunting for the year. Interest in waterfowl hunting also appears to be on the decline here. In years past we have had groups of out of state hunters that came every year and hunted. This year they were noticeably absent. Although no counts were made of duck hunter visits, there were an estimated 50 visits by waterfowl hunters.

Pheasant season opened on October 27 with quite a few hunters out. The pheasant season ran through January 31, 2013 with a limit of three roosters. These were pockets of pheasants here and there but in general their numbers are low this year. No counts were made of the number of hunters and we do not use the wing boxes for monitoring as we do with grouse. An estimate of 300 visits by pheasant hunters is made. Some people combine a pheasant hunt with a grouse, duck, or deer hunt.

Grouse season opened on September 1. The dove and grouse openers are now the same. The season ran through January 31, 2013 with a bag limit of 3. The season end date now coincides with the end date for pheasant. These extensions will probably not result in many visits as most grouse hunters quit hunting in November and it is generally too hot in early September. No hunters were known to have been out for the opening day. Most of the refuge is open to grouse hunting except the natural areas and around building sites. We do get quite a few out of state hunters. Hunter harvest is reported through voluntary wing collection boxes placed at five locations on the refuge. In 2012 we had 117 hunter days. Reported harvest was 140 prairie grouse including 13 chickens, 122 sharp-tails, and 5 unknown or hybrids. More complete information on grouse harvest can be found in section G10a.

The refuge is also open for dove hunting but few hunters come here specifically to hunt doves. A few are shot by grouse and pheasant hunters.

The Nebraska rifle deer season ran from November 10 – 18. Many hunters were concerned that deer numbers would be down due to EHD losses over the summer. We again did not allow hunters to shoot a white tailed doe on the bonus tags that they received with their permits. We have done this for several years and most hunters now seem aware of the regulation.

A total of 65 deer were recorded as harvested during the rifle season. This includes deer taken under Sandhills and Calamus West general permits, state wide buck permits, and statewide youth permits. More complete information on deer harvest can be found in section G8. Numbers come from records obtained at Nebraska Game and Parks check station. This is down some from previous years, likely due to EHD killing many deer prior to the season.

All of the refuge west of Highway 83 is in the Sandhills Deer Hunting Management Unit and all east of the highway is in the Calamus West Unit. In 1995 Nebraska Game and Parks removed Valentine NWR from the area where doe only Sandhills permits were valid. Starting in 1997, a statewide bucks only permit was also available. Starting in

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2006 there were also youth statewide permits available. The refuge probably receives about the heaviest hunting pressure of any location within the units.

The refuge is also open for muzzle loader deer hunting. The season ran from December 1-31. A muzzle loader permit allows the harvest of both bucks and does of either mule deer or white-tailed deer. This year Nebraska Game and Parks included a bonus tag for an additional white-tailed doe with every muzzle loader permit. Bonus tags were not valid on the refuge.

We will not know how many deer were harvested during this season as hunters must check deer in via the internet or by phone. Neither request information on where the deer was shot. This information was available from check station in the past. We did talk to one hunter who reported shooting a white-tailed buck on the refuge. We did get some spill over hunters from Ft. Niobrara NWR which is open for archery and muzzle loader deer hunting. They limited the number of permits to 100 at Fort Niobrara due to heavy EHD loss.

The refuge is also open to archery deer hunting which runs from mid-September through the end of December. Crossbows are also legal for archery hunting. Only a few hunters were known to have visited the refuge for archery hunting. This year Nebraska archery permits again included a bonus tag for an additional white-tailed doe. This bonus tag was not valid on the refuge. In 2009 regulations on deer check in for archery were also changed to allow hunters to check in deer on the phone or via the internet as well as at check stations. Hunters using the new method were not asked the name of the public land area that a deer was harvested on. This information had been collected in the past at check stations.

Coyotes can be hunted on the refuge from December 1 through March 15. A free permit is required. There is no charge for the permit. Running coyotes with dogs is not permitted. For the 20011-2012 season, 36 permits were issued at Valentine NWR. The list from Fort Niobrara was lost so the total number of permits issued is not known. Ten permits were returned. Successful hunters reported taking 15 coyotes. It is felt that successful hunters are more likely to return the cards.

## **9. Fishing**

Nine refuge lakes (Watts, Rice, Duck, West Long, Pelican, Hackberry, Dewey, Clear, and Willow) are open to fishing year round. Fishing, especially ice fishing, accounts for most visits to Valentine NWR. Not enough counts were made to provide a good estimate for fishing visits. An estimate of 20,000 visits is made. This year we opened the refuge fishing lakes to catching bull frogs. We will follow Nebraska Game and Parks regulations on methods of take, bag and size limits, and season. Hours will be the same as for fish. Bull frogs are an invasive species on the refuge. Take of other species of frogs will not be allowed. Few people went after the frogs even though they were very abundant this year.

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Photo H -9a. The refuge was opened to frogging this year. MLL

Spring fishing was good and many fishermen were out catching both bass and pike on refuge lakes. The lakes were very full in the spring and people were launching large boats. Few fall fishermen were out this year. This used to be a popular time to fish on the refuge.

The first ice fishermen of the year were out on December 5, 2011. Fishing for perch and bluegill was very good on Hackberry Lake with a lot of limits taken. Word got out and fishing pressure was steady throughout the winter. The last ice fishermen of the year were out on February 22, 2012.



Photo H-9b. Bluegill caught on Pelican Lake. MLL

Refuge size limits remained the same with a 15-inch minimum on bass and northern pike with a 28-inch maximum size limit (pike greater than 28-inches must be released). The state has a 15-inch minimum on bass for most public waters including the refuge. Minnows are prohibited on refuge lakes to prevent introduction of exotic fish. Gas powered boats are not allowed.

#### **10. Trapping**

A drawing was held and three trappers selected from 4 applicants for trapping on the refuge for the 2011-2012 season. There was a \$20 application fee and a \$100 fee for permits. The refuge was divided into three units and each trapper was allowed an assistant. The refuge season ran through February 29.

As part of their permit trappers were required to keep a daily log and supply the log to us at the end of the season. None of them did so. They were all contacted by phone and later letters requesting harvest information sent to each. None of them replied to the request and they will not be allowed to trap on the refuge in the future.

#### **11. Wildlife Observation**

Blinds were placed for observation of both sharp-tailed grouse and prairie chickens. The blinds were put on leks in Habitat Units 30A2 and 16B2. People come from all over the country and even a few from foreign countries to watch the grouse display. We have a reservation system for the blinds. The two blinds were booked for 27 mornings. Several groups also used the blinds without reservations.



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## 17. Law Enforcement

Refuge Officer Lindvall submitted a request to relinquish law enforcement authority after 30 plus years of being a refuge officer. The request was approved and took effect on January 31, 2012. There is now one full time law enforcement officer for the Complex.



Photo H-17. Manager Lindvall receiving award for 30 plus years of serving as a Refuge Officer. JG

Refuge Officer Brandon Jones from Rainwater Basin assisted with law enforcement patrols during the rifle deer season opener.

All notice of violations written in 2012 at Valentine NWR were logged into IMARS, the refuge LE database. In calendar year 2012, there were 12 Notice of Violations issued for violations occurring on Valentine National Wildlife Refuge. Numbers and categories are listed below.

<b>Valentine NWR</b>	<b>NOV</b>		<b>Warn</b>	
Fishing in Violation of State Law-size limits	1		1	\$225
Fishing in Violation of State Law-exceed bag limit	2			\$450
Speeding	4			\$625
Day Light Use Only	2			\$350
Operate Boat in Violation of State Law- No life jackets	1			\$125
Operate Boat in Violation of State Law- Unregistered boat	1			\$125



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Reckless Driving	1			\$175
Abandon Property on NWR			1	
Hunting-failure to validate tag immediately upon kill			1	
Fishing-no license on person			1	
Fishing-use of outboard motor			1	

## **18. Cooperating Associations**

The Complex has a friends group, The Friends of the Sandhills Prairie Refuges, which does projects on Valentine NWR. The group sponsors the book and souvenir sales at the Fort Niobrara Visitor Center and has a quarterly newsletter. Refuge Manager Lindvall attended the quarterly board meetings and provided articles for the newsletter.

### **I. EQUIPMENT AND FACILITIES**

#### **1. New Construction**

The contract to construct a new refuge office at Pony Lake was let for \$631,159. The contractor started work in July and had the building enclosed and mostly finished by the end of the year. A standard design was used for the building and has a small area for visitors, three offices, an open office area, and a break room. A new office at a different location was called for in the Refuge Comprehensive Conservation Plan and Site Plan. The office is more centrally located and more convenient for visitors travelling Highway 83.

If fy 11 we received Visitor Facilities Enhancement Funds to improve fishing access at 6 lakes. Nebraska Game and Parks also contributed funds to the project. Bids were above the allocated amount so 2 of the access points, Watts and Duck were deleted from the project. Cement boat ramps, walkways, and handicapped parking were constructed at Hackberry, Clear, Pelican, and West Long Lakes. New accessible docks were installed at Hackberry, Clear, and West Long. Pelican Lake already had a dock in place. The steel truss docks roll on wheels for removal prior to freeze up. We had some funds remaining and hope to be able to purchase docks for both Duck and West Long next year.

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Photo I-1. New dock, accessible parking, and cement boat ramp at Hackberry Lake.  
MLL

## **2. Rehabilitation**

A plugged culvert at the outlet of East Sweetwater Lake was replaced with 2 larger culverts. This is about the only place to move cattle north without going out on the highway. Beaver plugged the culverts and we tried a wire beaver guard and an electric beaver guard to keep them away. Neither worked well. Dirt was placed over the culvert at the outlet of W. Twin Lake to keep from crushing the culvert. The culvert at Homestead Lake was service by placing dirt over the top and rock rip rap near the ends.

Eight cattle guards on the Little Hay Road were rehabbed and widened. The old auto gates were in poor condition and were so narrow that vehicles pulling boat trailers often hit the wings causing damage to the auto gate and the boat trailer. Existing guards and some not in use were used for materials. The new guards are either 1.5 or 2 times wider which should help fishermen pulling boat trailers from hitting the wings. Three are left to do on this road.

Gravel was spread in potholes and in areas where base rock was showing on the Little Hay Road. There is still insufficient gravel on the road to prevent damage to the base course. The remaining pea gravel was spread on the Pelican Lake Road. This completed last year's road project.

## **3. Major Maintenance**

Extensive repairs were made to windmills and tanks in the fall. There are about 85 mills on the refuge and most need attention. We are in the process of replacing all the wooden windmill platforms with steel platforms. Many of the wooden platforms were rotted and

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a safety hazard. We used grazing funds to pay for construction of the platforms and other needed parts. We have also used grazing funds to drill new wells and do other work that requires specialized equipment. Refuge staff have also done many repairs to windmills, towers, and tanks. Muskrats were a big problem this year as they moved into the tanks, sometimes the only water available due to the drought. High winds in October, gusts to 69 mph, damaged some of the mills.



Photo I-3. This is what a 70 mph wind can do to a windmill. MLL

The following repairs were made to our Air Ranger Airboat; welded cracks in cage and motor mount, replaced serpentine belt, checked nyloc nuts on motor mount, installed new running light, raised and repaired front seat, and washed props. Unfortunately no way was found to smooth out the poly bottom which was badly damaged while the boat was in North Dakota on flood relief. The poly was damaged over the years mostly while providing emergency response to floods in North Dakota. The boat was driven over pavement which scratched the poly and affected the performance of the boat. At the end of the year the airboat hull was delivered to a repair shop for replacement of the poly on the bottom of the boat at a cost of \$5,300.

The following repairs were made to the airboat trailer; replaced anti-slip on fenders, repaired broken bunk, repaired leaking tires, and turn lights.

#### **4. Equipment Utilization and Replacement**

A prototype of a drive device for rotary fish screens was completed. The drive is solar powered and was designed to turn the rotary screens when water flow is not sufficient to do so. Rotary fish screens work well when there is sufficient flow to turn the screens but become plugged in low flow when the screens stop turning. We had the rotary screens on hand. The prototype was placed in the Pelican Lake Water Control Structure and did not

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work. The screen took quite a bit of force to turn when it had water on both sides of the screen. A rubber tire driven by a gear motor was used and would slip rather than turn the screen. A direct gear drive may have worked but would have required extensive modifications to the screen. I think a belt screen as we have on several other lakes may be a better solution.

#### **6. Computer Systems**

A new desk top computer was purchased for Maintenance Worker Suhr.

#### **7. Energy Conservation**

The house trailer, Pelican Lake Quarters, and the Trappers Shack were all winterized. To save energy, we do not heat these buildings. We also turn the heat down in the office at the end of the work day and turn the air conditioning off when we go home for the day.

#### **8. Other**

### **J. OTHER ITEMS**

#### **3. Items of Interest**

The 480 acre Yellowthroat WMA in Brown County is managed from Valentine NWR. The area has an excellent mix of grassland and wetland. There is a water control structure located between the marsh and lake on the area. The land was acquired in fee title from the Farmers Home Administration. Much of the sandy soil on the area was farmed under center pivot irrigation prior to acquisition. All has been seeded back to native grasses. The area is open to public use including hunting and fishing. Fishing was good this year with nice catches of bluegill and perch made during the winter.

We visited the area throughout the year and noted that an adjacent landowner continues to use our access easement road to get to his trailer located south of the area. He was sent a letter advising him that he is not to use the road and that future use may result in trespass charges.

There is a water level gauge on the water control structure. The top of the gauge reads 10.12 and is even with the top of the angle iron on the structure. This is a reference should the gauge be destroyed. The gauge is not tied to an elevation above sea level. No readings were taken in 2012. Muskrat or beaver have clogged the water control structure and we will need to put in an electric beaver guard here if we want to lower the water level. When the water control structure is plugged and the water is high, water runs around the dike on the north side. This occurred in the spring of 2012.

A contract sprayer sprayed Canada thistle with Milestone and leafy spurge with Plateau in the fall.

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An old irrigation well was capped with a cement filled tire. The well was under water for many years but is now visible due to the drought. The local NRD requested we cap the well. We notified them that the work was completed. The location of the well recorded when the cap was placed is N 42 22 06.8; W 99 49 59.9. This is slightly different that the location given us by the NRD. There is also an abandon windmill well pipe and tank near this location at N 42 22 07.5; W 99 50 00.3. This well and the one located west of the parking area should be pulled.

#### **4. Credits**

Refuge Manager Lindvall wrote sections A; D-1 and 4; E-1,4,5,6,8; F-7,9,10,12,13; G-11, H- all; I- all; J-3; K: Biologist Nenneman wrote sections B; D-5; F-1,2,5, 7 (monitoring); G-1,2,3,4,5,6,7,8,10,17. Photo credits; Mark Lindvall - MLL; Mel Nenneman – MN; Janet Grabher JG

#### **K. FEEDBACK**

We intend on continuing writing the annual narrative even though it is no longer required. It is the only historical record of what is done on the refuge and will hopefully be useful to future managers. The numerous databases that we feed will surely not tell the story of what happened on the land. Reports will be filed and eventually get lost or thrown out. Over the years I have often told people to put it in the narrative if you want it to be available at some time in the distant future. We often refer back to old narratives to answer questions and I hope we can learn from those who went before us.

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Photo F. Volunteer helping Biologist Nenneman age grouse wings. MLL